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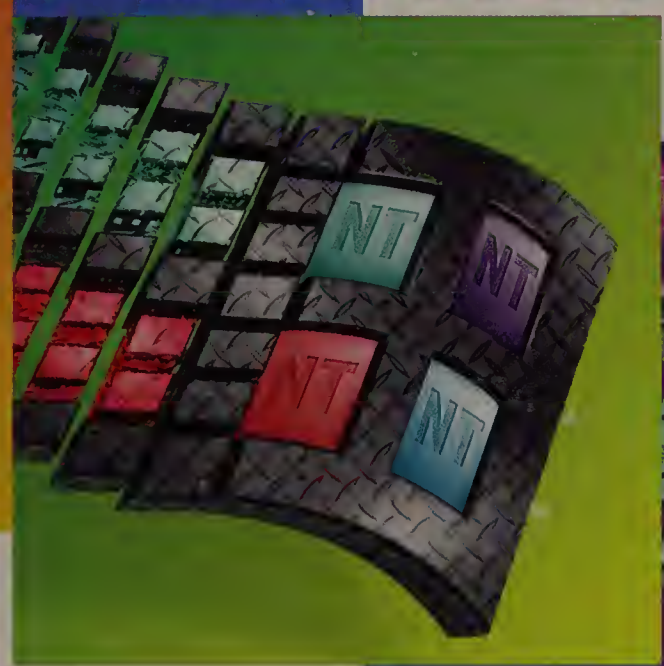

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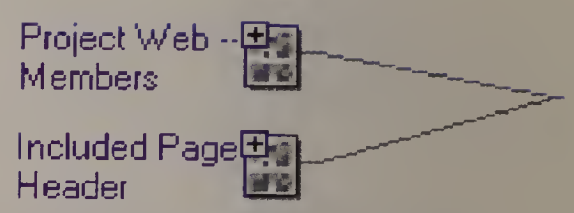

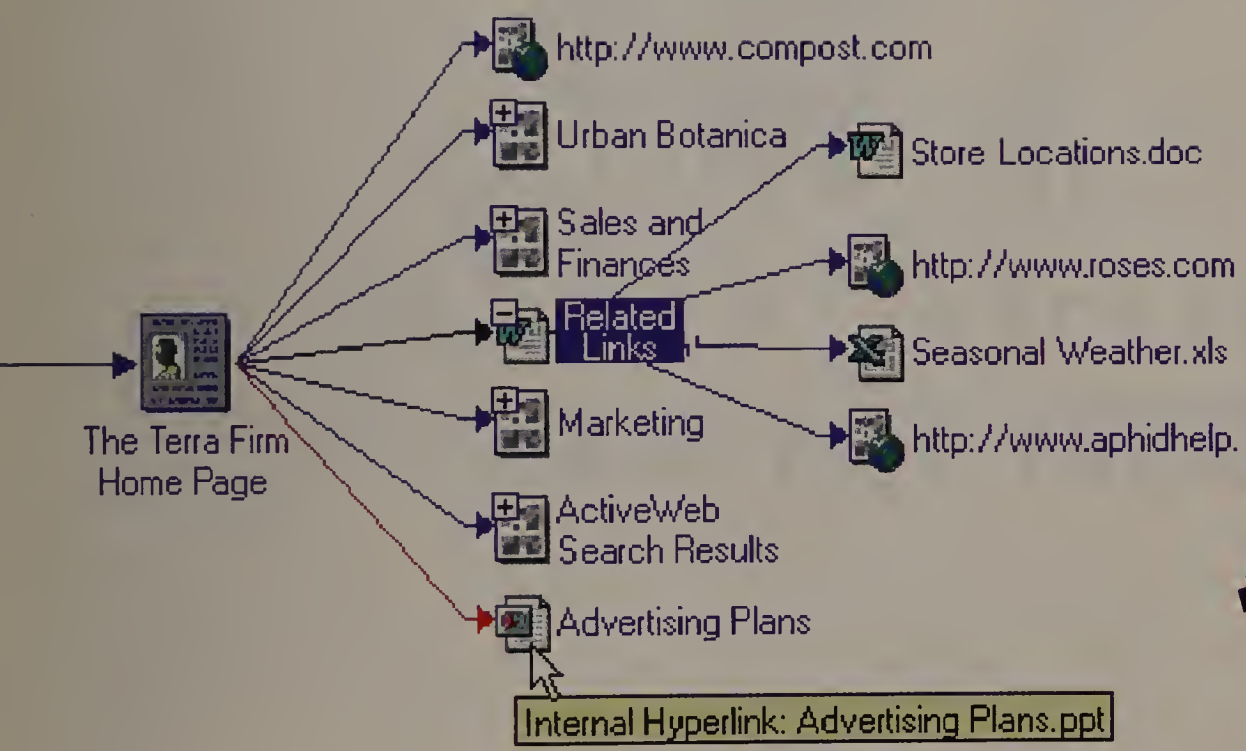
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PC WORLD

JANUARY

VOLUME 15 ◆ NUMBER 1

COVER STORY

122 **WAR OF THE WINDOWS: NT 4.0 VERSUS 95**

REVIEW Wondering which Windows works best? Windows 95 may be on millions of PCs, but the powerful and robust NT Workstation now sports a Win 95 interface, making it easier to use too. *PC World* tested both versions of Windows with 13 PC configurations and more than 60 hardware and software products, for an in-depth assessment of compatibility and performance. So which Windows should you put on your PC? Here's the bottom line. Plus at look at what's ahead in the coming year for Windows 97.

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REVIEW Whether for sprucing up a Web page or adding pizzazz to a presentation, desktop scanners claim to be simple and much improved. We test eight models that cost less than $500.

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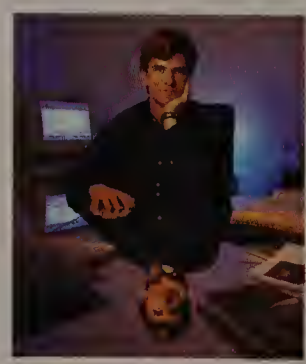

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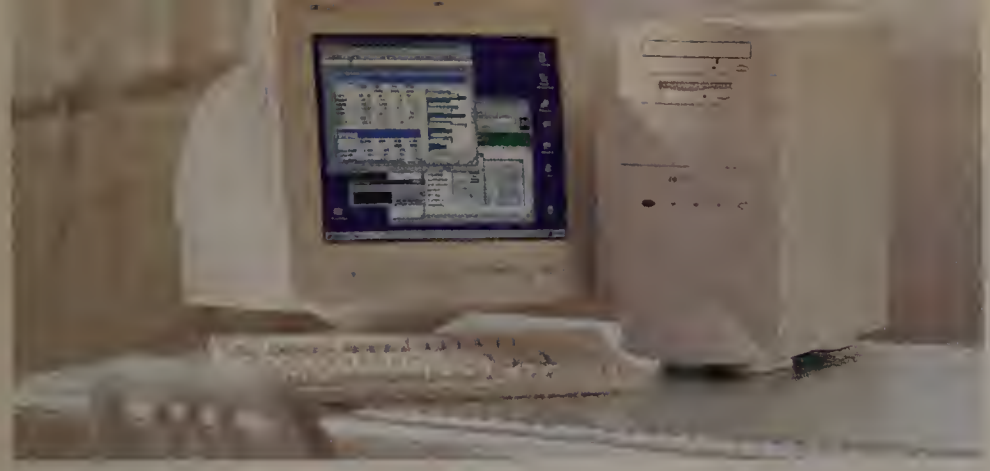

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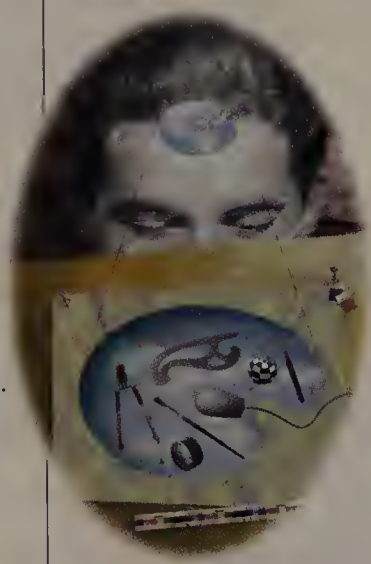

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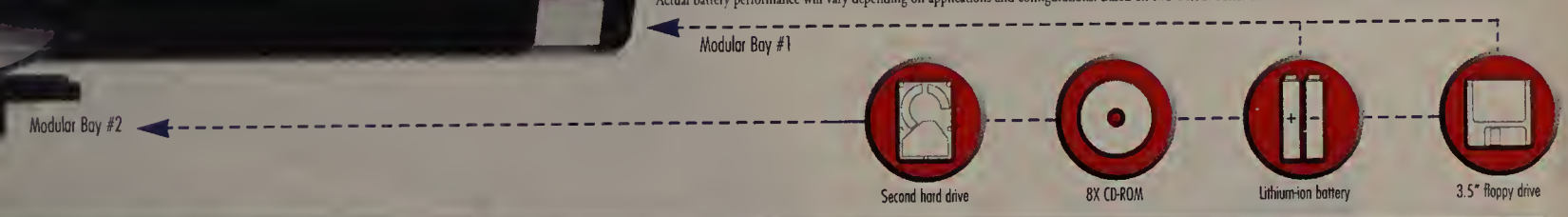

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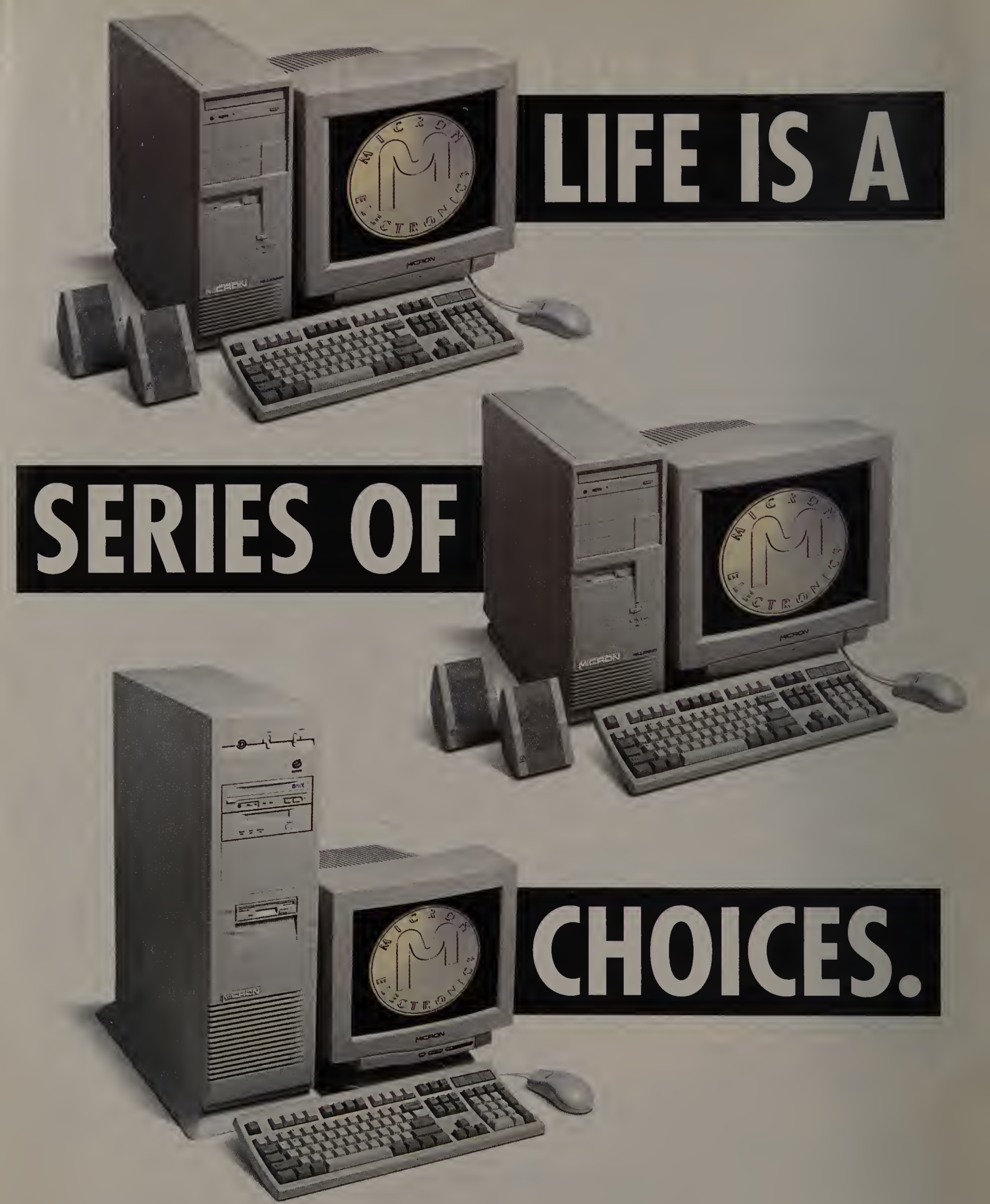

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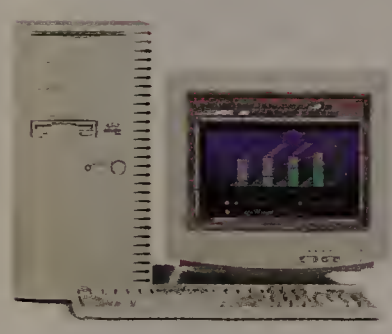

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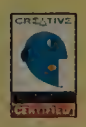

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Windows 95, NT, and Beyond

CHICAGO, NASHVILLE, MEMPHIS, CAIRO—the Windows we want always seems at least a year away and as remote as Timbuktu. And on the verge of '97, that's not about to change anytime soon. What's different is that it's harder to figure out *which* Windows we want. Today there are no fewer than five versions to choose from, and at least more two versions and one interface upgrade are scheduled to ship in the next six to nine months. And that's just considering options for desktop and notebook PCs.

In the coming year, expect at least three upgrades to Windows: Nashville, Memphis, and NT 5.0.

WINDOWS TODAY

THE VERSIONS OF Windows available now for desktops and notebooks are Windows 95, Windows 95 OSR2, NT Workstation 4.0 with its new Win 95 interface, Windows 3.*x*, and Windows for Workgroups 3.*x*. Choosing among them is far from simple.

Windows 95 vs. NT 4.0. For this month's cover story, "War of the Windows: NT 4.0 vs. 95," we tested the final shipping version of NT Workstation 4.0 with more than 60 hardware and software products and more than 15 hardware configurations. We compared it to Windows 95 in performance, compatibility, and features. Our recommendations vary, depending on where you work and the type of PC you use.

For small companies with 486 and Pentium PCs and no IS department, Windows 95 is the best bet. It works with more software and hardware than NT, and it's easier to use and (though still not crashproof) far more stable than Win 3.*x*.

Midsize and large companies with well-equipped Pentiums and IS departments can choose either route, NT or 95. The two versions are a wash in terms of overall performance, which varies more by application than by operating system. They're also equivalent in ease of use, now that they share the same interface. The trade-off: NT's stability and security versus Win 95's compatibility. If you're leaning toward NT or your IS department mandates NT, find out *beforehand* if drivers are available for all your peripherals, and check with vendors on software compatibility.

For notebooks, Windows 95 is usually the best choice. NT does not yet support Advanced Power Management or Plug and Play, although several vendors—including Dell, Digital, and IBM—are writing drivers to support NT on notebooks.

Windows 95 OSR2. If you're buying a new PC now and want Windows 95, what you'll get is Windows 95 OSR2 (OEM Service Release 2), which is not sold as a separate, shrink-wrapped product. Among OSR2's many updates and fixes are a new file system—FAT32—for access to hard disk partitions larger than 2GB; support for Universal Serial Bus peripherals; DriveSpace 3, a disk-compression utility; support for Intel's upcoming Pentium MMX and compatible processors; and a variety of Internet utilities.

WINDOWS TOMORROW

IN THE COMING YEAR, expect at least three more upgrades to the Windows operating system: Nashville, Memphis, and NT 5.0.

Nashville. The next version of Internet Explorer, known as Nashville, will add an optional interface to Windows 95 and NT 4.0. The beta version of Internet Explorer 4.0 is slated for December release, with the final version scheduled to ship in the first quarter of this year. More than a simple Web browser, IE4 will let you select a single Web-based view for your desktop, hard disk, intranets, and the Internet. The goal: a simpler, more visual way to navigate, no matter where your documents and files reside.

Memphis. The next version of Windows, codenamed Memphis and unofficially called Windows 97, will include IE 4.0, an assortment of features from OSR2, and other updates. The beta release is scheduled for the first quarter of this year; Microsoft says the final version will ship midyear at the earliest. Among the new features: IE 4.0's Web-centric interface; the FAT32 file system; a new Windows Driver Model, designed to provide a single set of drivers for Windows 95 and NT; and support for USB and other new hardware standards (see page 124). Unlike OSR2, Memphis will be sold as a shrink-wrapped product.

NT 5.0. Don't mistake NT 5.0 for Cairo. Some of the technologies dubbed "Cairo" are built into NT 4.0; others will be delivered in NT 5.0, which Microsoft expects to ship soon after Memphis. Like Memphis, NT 5.0 will support unified WDM drivers, Plug and Play, and Advanced Power Management. To this, it will add an array of server-side improvements for linking PCs to networks and the Internet.

And the long-promised merger of Memphis and NT? Not until next year at the earliest. Sounds like the Windows we really want.

Cathryn Baskin is editor in chief of PC World.

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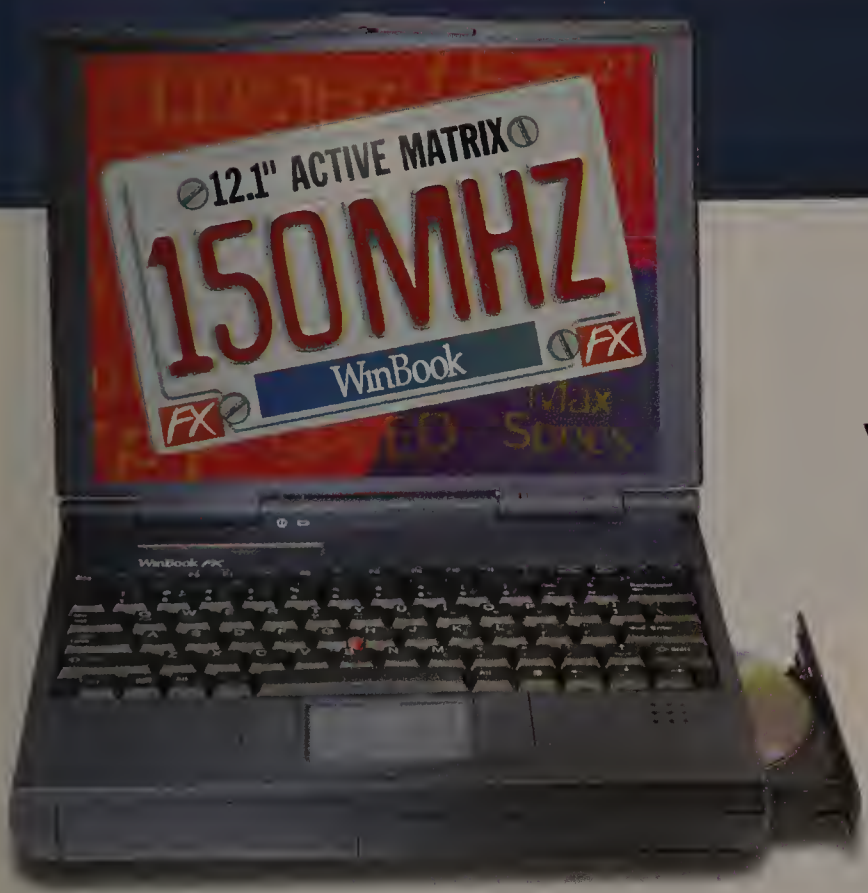

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YOUR TAKE ON: Upgrades and motherboards ◆ Recycling RAM ◆ Modem bug zapped

GRADING OUR UPGRADES

I RESPECTFULLY SUBMIT that you missed the boat with your upgrade article ["Upgrades: The Best for the Buck," November]. With regard to RAM, I have noticed a significant increase in speed after moving from 16 to 32MB on my Pentium-100. When running Internet applications (browser, newsgroup reader, mail program) and one other program in the background (like Word), my hard drive used to thrash while looking for information in the swap file. No more. With RAM available at about $5 per MB, this upgrade is well worthwhile.

As you stated, 486 upgrade kits may not always be worth the money. But if a user is willing to do a little research, compatible upgrade CPUs can be had via mail order for about half the price of a kit. The user must read the motherboard manual and/or make a few phone calls to check compatibility of BIOS, voltage, and jumper settings.

There is also the risk-taker's approach to upgrading: overclocking. For example, many Pentium-75 PCs will run comfortably at 90, 100, or even 120 MHz. Certainly this voids warranty and is not without risks: People who've tried to run their chips at unreasonable speeds (a 133 chip overclocked to 200 MHz) have burned them out. But the vast majority who have aimed for a slight increase in speed have either succeeded or found that the computer would not boot correctly until the speed was set back.

Douglas Morse, New York

DID I MISS SOMETHING? Why didn't you include the replacement of the motherboard on a 486/66 with a 486/133 (AMD)? I have seen these advertised for $98. A user who is not "technical" can get some local tech to do it for about $35. The total cost would be around $135.

That is what I did when replacing a 386/40. The new motherboard comes with a CPU and fan as well as four 30-pin slots (to save some of the old memory) and just two 72-pin slots (for the recently inexpensive RAM). It also comes with both PCI and ISA slots. The built-in controller supports PCI for the disks.

I believe this is the most cost-effective way to build the new so-called NC. In fact, Intel sees the minimum NC as a "P-200 with power steering and power brakes."

Eduardo Salgado, Laredo, Texas

YOUR UPGRADE ARTICLE was one of the best and most informative write-ups I have come across in a long time. I was about to invest another $1000 to upgrade

my 486 PC. After reading your article I believe I can reduce that amount greatly. Keep up the good work, and thanks.

Gary Wilkinson, Central Point, Oregon

I CAN'T BELIEVE YOU people tried this, much less published it!

Your November article on upgrades contains a photo and caption that could cause anyone who sees it to attempt the same thing—with disastrous results. The photo shows a motherboard with an upgrade CPU in a ZIF socket whose handle has been taped down. Not only is good contact not ensured (leading to system crashes and data loss), but when the system warms up, the adhesive in the tape will flow—allowing the handle to slip until the CPU is released. If the CPU is in a tower case, it will then fall out, probably bending a few pins or sustaining worse damage when it hits the bottom of the case. Of course, anything you were working on would be toast, too. If you have purchased an upgrade CPU and can't close the handle all the way on your ZIF socket, return the upgrade for a different one.

Derek Piasecki, Internet

Editor's response: We certainly do not recommend a Scotch-tape solution to anybody; we wanted to illustrate the problem our testers had run into. —Yael Li-Ron

IN YOUR "RAM SIMMPLIFIED" sidebar ["Upgrades: The Best for the Buck," November] the author advises PC users whose slots are full to take out their old RAM and throw it away. But old RAM should not simply be discarded: Instead, you should trade it in or sell it. Someone out there can always use your old RAM, and many companies will trade for it—even if it's bad—because they can use the parts.

Ron Langdon, Internet

THE LAST LAUGH?

IN THE NOVEMBER PC WORLD you printed this: "Give your language it's do respect." Not everybody is a writer, but that doesn't mean you should subject your readers to poor language. "Run your Web page through a spelling and grammar checker" ["The Web and You," November]. Too bad you didn't follow your own advice. The word "it's" is a contraction for "it is," and it should be obvious that "due" is meant where "do" resides.

Alan Mitchell, Atlanta, Georgia

Editor's response: You're absolutely right, a fact we're punfully aware of, having received lots of similar messages from other readers. The spelling was deliberate: We were just trying to be witty. Oh, well. —Yael Li-Ron

HELP FOR REVEAL USERS

I HOST A NEW SITE that is devoted to supporting people who were abandoned by Reveal Computer Products. The site is unique in that it finds the original manufacturer of the product so you can still get software and hardware support. It adds a new product every other day to its list. The URL is http://www.execpc.com/~ellingsj/.

ILLUSTRATION: PHILIP ANDERSON

I know there are a lot of people out there who want support.

Jason J. Ellingson, Internet

Editor's response: That's the first piece of good news Reveal owners have had in a long time. Since we ran our last article on Reveal's Chapter 7 bankruptcy proceedings (PC World Online, October 17), the company's CompuServe forum has been shut down. Users can also try Reveal's fee-based phone support, a $2-per-minute service maintained by a company called CNM. The phone number is 900/225-3000. **–Michael Desmond**

COPYING NOT CUTTING

I VERY MUCH enjoyed your article about online help ["The Complete Guide to Free Help Online," October]. On page 133, in "Get the Right Advice the First Time," you recommend using Windows SysEdit and cutting and pasting the contents of autoexec.bat, config.sys, and so on. You should have said "copying and pasting" because cutting the files would cut the information on them. Then when your computer restarted, you would *really* need online help.

Ramon Campos, Tijuana, Mexico

U.S. ROBOTICS À LA MODEM

I WAS EXTREMELY pleased and quite relieved to read your October "Bugs and Fixes" article about the bug in some U.S. Robotics V.34 Sportster modems. In August 1996 I purchased a system with a USR 28.8 fax-modem installed. When I connected to a local BBS in terminal mode, I experienced the time-lag event bug that these modems suffer from. I tried for several weeks to fix it, with no success. Then my October issue of *PC World* arrived, and there in black and white was the answer to the bug I had resigned myself to living with. I immediately contacted USR and explained the problem. Ten days later I received a new modem as a replacement and have been connected trouble-free ever since—thanks to *PC World* keeping its readers up to date on the latest news and information in the rapidly changing world of computing.

Wayne Morris, Internet

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 12 for contact information.* ■

CORRECTIONS & CLARIFICATIONS

In *New Products* in the November issue of *PC World*, our review of Iconovex's EchoSearch browser utility should have stated that a preview list of your searches is available from the Options menu. Also, the product ranks its findings by conceptual categories, not alphabetically.

We listed an incorrect phone number for Tangent Computer in our October and November issues. The correct number is 800/800-5550.

PC World regrets the errors.

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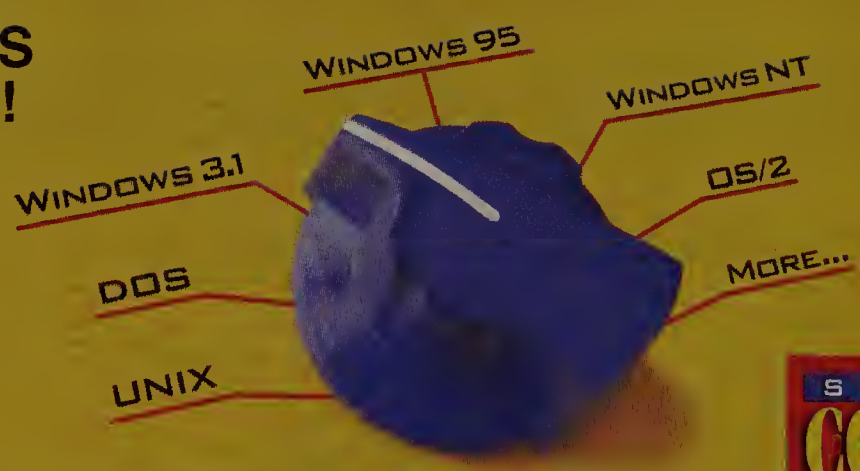

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SUDDENLY, EUROPEAN STANDARDS ARE A GORGEOUS NECESSITY.

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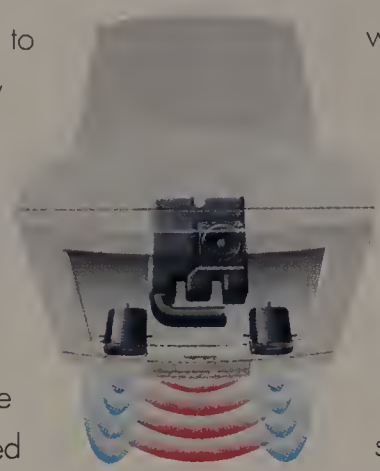

The media-ready series does more than extend Nokia's most award-winning model. It literally shouts innovation. Dual powered stereo speakers in front combine with a sub-woofer in the swivel/tilt base to shape audio at the intimate volumes most suitable for working close to a monitor. Combined with its standard in-bezel microphone, the media-ready series enables the complete convergence of computing and communications.

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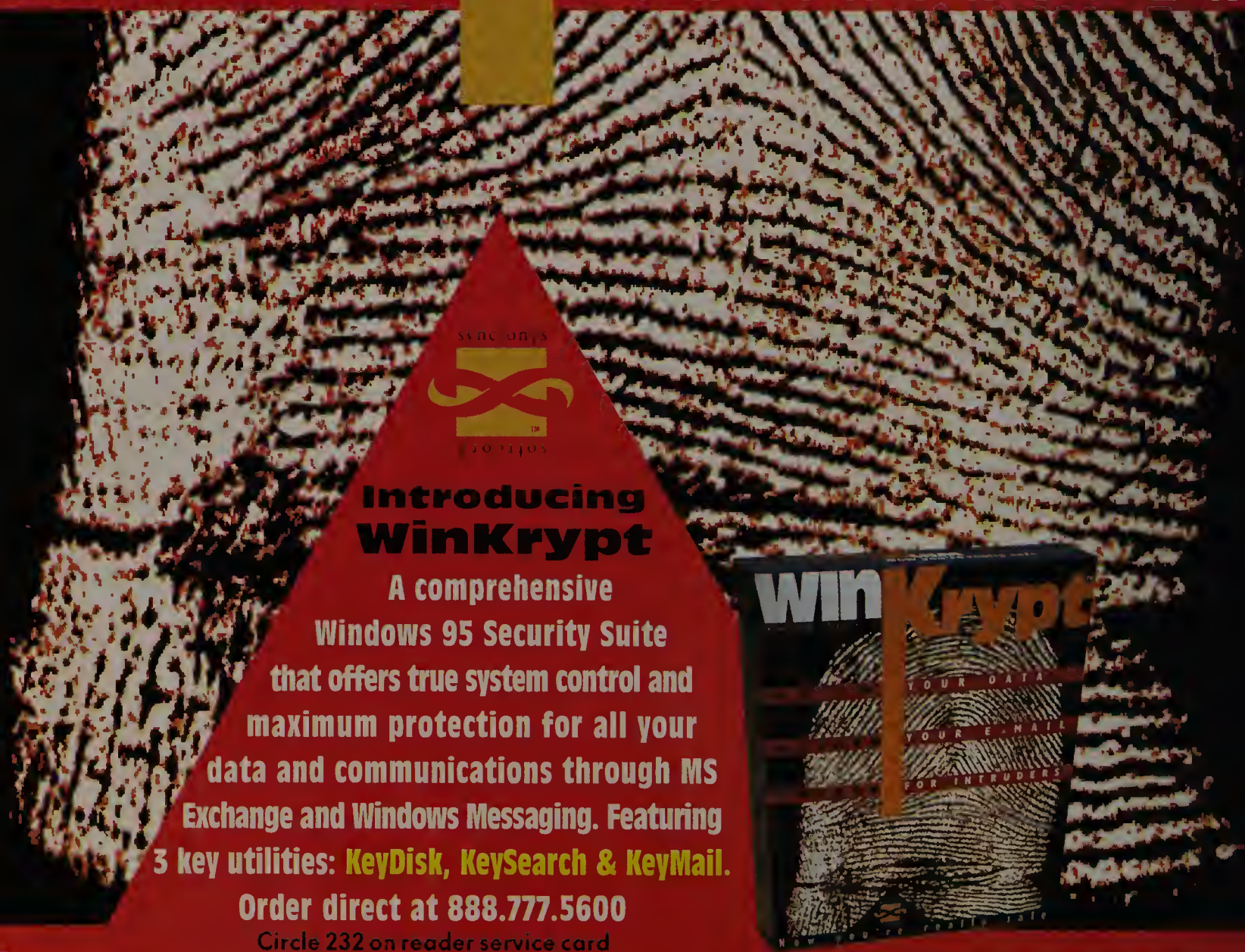

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When Good Vendors Have Bad Times

Top-rated PC company Micron runs into trouble with tech support.

NICK GLORIOSO HAD ALWAYS considered himself a patient man. He rarely lost his temper or raised his voice. Then he bought a Micron computer and logged more than eight weeks and four dozen phone calls trying to straighten out everything from a missing CD-ROM to a faulty hard drive. Now he's mad. And he wants everybody to know about it.

Once you've done your research, buying a new PC ought to be easy. But it was anything but for Glorioso, an instructor for General Motors in the Chicago area. He ordered his Micron Millennia in July 1996 and spent the rest of the summer trying to get it to work properly. His story—which took him nearly an hour to recount over the phone—sounds like a textbook example of how not to conduct customer service: hold times of up to 90 minutes; unreturned phone calls; promised shipments that never arrived. Ultimately, Glorioso got so angry and frustrated that he called Micron president and CEO Joseph Dealposa at home one Sunday evening. Five days later Glorioso received a replacement system that's been humming along without a hiccup ever since.

Frustrated consumers call *PC World* every day with tales of poor customer service at the hands of hardware and software companies. So why does Glorioso's tale of woe stand out? Simple. This is *Micron* we're talking about: The company that *PC World* readers have consistently ranked at or near the top in service and satisfaction. The company whose customers overwhelmingly say they would buy from again. What's happening to compel Glorioso and others to solicit help from *PC World*? Has the Cadillac of PC service lost its touch?

WAITING AND WAITING AND ...

IN FAIRNESS, Micron's overall service stats are still impressive. It's one of only two companies (Dell is the other) to receive a Best rating for service in our December 1996 reliability and service report ("Good-Bye to Good Support?"). But look a bit deeper, and you'll find a drop in two key categories: the time it takes customers to reach someone who can help them (called "Time to Talk" in our reliability and service ratings), and the time it takes to get problems resolved ("Time to Resolve").

Micron customers who respond to our monthly Reliability and Service Monitor say it's taking longer to reach a tech support representative who can help them. For example, in May 1996 when we tallied responses for the previous six months, Time to Talk averaged 24 hours. By September, that figure had increased to 32 hours. According to recent *PC World* data, it's also taking Micron customers longer to get problems resolved, from an average of just over seven and a half days in our May 1996 tally to almost nine and a half days in September.

These numbers hit close to home when I bought a Micron Home MPC myself late last June. It arrived without a hitch in early July and was working fine—at first. Then I started to load my own software and ran into a series

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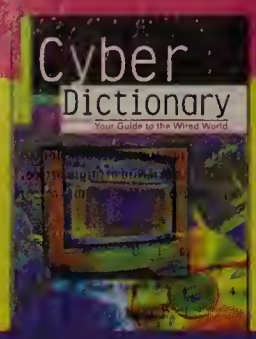

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COMING UP

IN FEBRUARY

MICROSOFT OFFICE 97: UPGRADE HEAVEN OR HYPE?

Microsoft is trumpeting the new version of its suite, with a reworked, easy-to-use interface; new Internet features; and an innovative information manager called Outlook. Is it upgrade-worthy or just the latest oversell?

TOO BUSY TO WORK: INFO OVERLOAD

Reports, memos, e-mail, faxes, voice mail, pages...technology designed to make us more efficient has ended up increasing our workload. Here are some tips for turning technology back into a time-saver.

ISPs: WHERE TO GO ON THE WEB

Internet service providers are not all the same. We signed up with 14 of the most popular national ISPs, enlisting reviewers from big cities to rural communities. We'll pick the ISPs most likely to keep your surfing free of snags and shoals.

SPECIAL REPORT ON WEB PRIVACY

Looking for anonymity? Privacy on the Internet doesn't exist. Almost anyone can track anything, from the Web sites you visit to your use of e-mail and online shopping. Here's the reality and the best way to protect yourself.

ALSO NEXT MONTH

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PC WORLD

of baffling error messages. I did what most customers would do: I called tech support—and waited 45 minutes. Then, when the first fix didn't work, I called and waited again. Thirty minutes. And again. And again. Over the next three months, I waited on hold for a total of several hours and spoke with numerous technicians—none of whom were able to help me. Ultimately the problem was diagnosed as a bad motherboard. Great, I thought, at least now we know how to fix it. But diagnosing a problem is one thing; correcting it, I learned, is another.

I spoke to one obviously green technician who kept putting me on hold while she conferred with her supervisor; to another who couldn't stay on the line to see if his suggested fix worked because he was hungry and wanted to take his dinner break; and to a third who freely criticized the skills and commitment of his associates yet failed to follow up on promises he himself made. Over the course of several months, I was promised return phone calls that never came, a new motherboard that didn't ship, and a return merchandise authorization number that I still haven't received as of this writing.

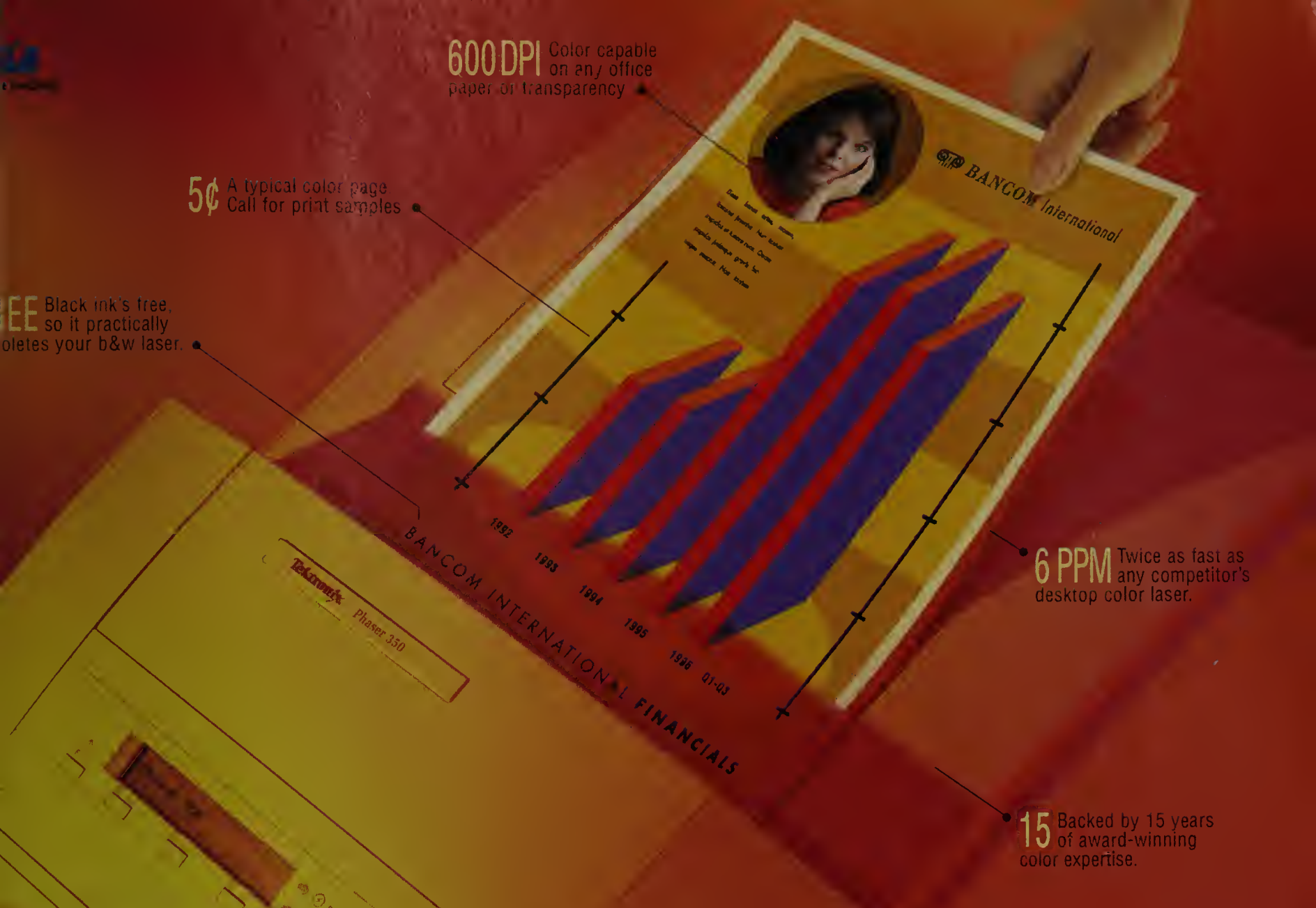
STRUGGLING TO KEEP UP

CLAUDIA DELANEY, Micron's director of support and services, acknowledges some rough times in the tech support trenches and points to phenomenal sales as the primary culprit.

But organizational changes—in particular, Micron's purchase of Zeos Computer in April 1995—have compounded service problems. Minneapolis-based Zeos had one of the worst service records in our reliability and service ratings.

Though Micron discontinued the Zeos computer line last year, it retained Zeos's service facility in Minneapolis, where more than half of Micron's technical support specialists are now based. A significant proportion of these support staffers are new to the company, which makes operating two support sites even more challenging.

Nowhere is the lack of coordination more apparent than in the poor handoffs between the Minneapolis-based tech- ▶



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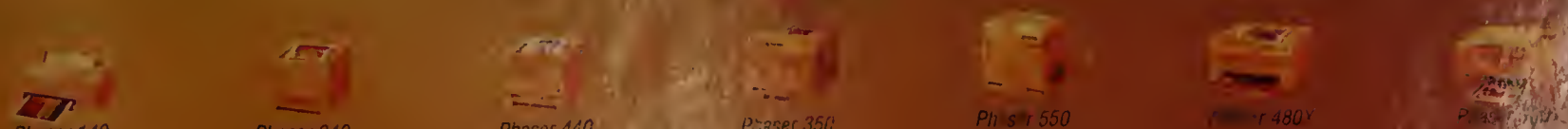

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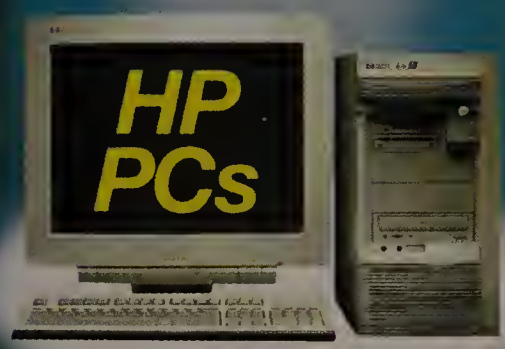

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THE ONLINE OPTION

Can't get through to Micron by phone? No kidding. Assuming you've still got use of a modem-equipped computer, here's how to reach the company online:

- **Internet:** Check out support at http://www.mei.micron.com/services/services.htm. From there you'll get access to the company's file library for recent driver updates, patches, and so forth, as well as a list of frequently asked questions. You can also e-mail tech support at techsupport.meic@micron.com.
- **CompuServe:** Go micron. Two Micron techs seem to monitor this forum regularly, as do several knowledgeable Micron owners, who are more than willing to offer advice.

nical support staff and the customer service department in Nampa, Idaho. "I was always waiting for something to be faxed from Minneapolis to Idaho," says Glorioso. I know what he means: So was I.

THE PRICE OF FREE SUPPORT

Meanwhile, what's Micron doing to fix its problems? "We're hiring new techs as fast as we can," says Delaney. But she adds that it takes about three months before a new hire can answer most customer questions quickly and independently. Micron has also revamped its knowledge base—the database tech support reps rely on to diagnose customer problems. But all these changes take time, cautions Delaney, who also points out that Micron charges nothing for technical support. "We're one of the few companies left that is doing that," she notes.

Free support is commendable, but it's not much help if you can't get through.

Let's hope Micron manages to escape the service quagmire it's trapped in. Quickly.

Send me your comments on customer service problems or any other topic you'd like to see covered in Consumer Watch *to consumerwatch@pcworld.com. Roberta Furger is a* PC World *contributing editor and author of the forthcoming* CyberGirls *(Warner Books, 1997, 212/522-7200).* ■

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IDC INSIGHT

Successfully Migrating to

Corporate America is fast embracing Windows NT workstation for its desktop computing as it seeks a true multitasking, robust, 32-bit OS with reliability, security, and high performance. The Pentium Pro, offering superior speed and performance, is far and away the preferred platform for NT. These were among the key findings of IDC's recent global survey of 1,500 corporate enthusiastic NT adopters and active evaluators.

International Data Corporation (IDC), the world's leading information technology (IT) research firm, recently surveyed 1,500 medium-sized and large corporations around the world about their advanced desktop PC usage and plans via in-depth telephone interviews. Primarily, the research analyzed how corporations are currently using and adopting advanced Windows NT/Pentium Pro systems and what users found as key drivers and constraints. The study focused on advanced adoption so that organizations adopting less than 10% NT systems among their total systems, within the next two years, were excluded from the survey.

The market momentum for NT/Pentium Pro systems will intensify over the next 3–18 months, especially among U.S. corporations. Key drivers for this upward migration include the accelerated price/performance improvements of the Pentium Pro; the increasing availability of 32-bit applications; and recent release and success of Windows NT Workstation 4.0. IDC predicts 1998 to be the pivotal cross-over year when U.S. Pentium Pro Processor PC U.S. sales will exceed Pentium Processor PCs overall, and when NT will surpass Windows 95 on desktops in large corporations.

Why Upgrade to Advanced PCs?

Corporate PC users are constantly seeking better CPU performance, more memory, faster data access times, and more powerful OS and application suites. In the late 1990s, technology continues t accelerate with more intensive requirements due to the increase in th size of applications and graphics-intensive files; expanded multimedi data types (color images, audio, and full-motion video); the inclusio of more software (Web browsers, utilities); and the constant IT man dates to cut costs and improve productivity. In addition, the tremen dous growth in the Internet, Web, and corporate intranets is bringin ever-greater amounts of data to the desktop.

Recent and unprecedented price/performance improvements i advanced PC systems have whetted organizations' appetites. IDC P pricing research indicates the cost of Pentium Pro systems will declin a full one-third to nearly half (or 33–47%) from the beginning to th end of 1996, depending on chip speed. As an industry example, con sider the advanced desktop offerings in late 1994 vs. late 1996 fro AST Computer. AST's high-end brand series has dropped in price b more than one-third, from about $4,300 to about $2,850 in estimate street price, while the overall performance offering has more than dou bled. In short, there has never been a time in which corporations hav needed advanced desktop PCs more, nor a time in which cost justifica tion for upgrading has been stronger for the business enterprise.

Pentium Pro—Platform for and to the Future

The Pentium Pro, Intel's sixth generation microprocessor family released in late 1995, was specifically designed to optimize the perfor mance of 32-bit code while maintaining backward compatibility wit previous x86 code. In essence, the chip is a bridge between today' world, which predominantly uses 16-bit OS (Windows 3.X) an applications, and the emerging world of 32-bit OS (NT, Windows 95 and applications, which is fast becoming the industry desktop stan dard. The Pentium Pro also offers unparalleled speed and performanc through its superscalar and superpipeline design; Intel's "Dynami Execution," and its L2 "cache on-board" dual-chip module.

As prices further decline, IDC predicts that demand for Pentium Pr PCs will increase significantly, especially in the corporate environ ment. Current street prices for NT/Pentium Pro systems have no fallen to less than $3,000—within the range of most corporate I budgets. Accelerating price competition and expanded product selec tion will continue through 1997, which will further fuel the market IDC anticipates Pentium shipments will peak in 1996, and the Pro with 15 million units, will surpass Pentium sales (13.9 million units as the dominant PC platform in the total U.S. market by 1998 (se Figure 1).

The Corporate Move to Windows NT

Migration to the 32-bit desktop enables true multitasking, improve stability, virtual memory, multiprocessing, and robustness. More tha half (53%) of those IDC surveyed currently do 32-bit applicatio development. Key drivers of 32-bit adoption cited by the IDC use base included new application availability, price declines, performanc gains, and the success of NT 4.0. Within two years, three-quarters o all internal PC application development will be 32-bit.

Key Advanced PC Study Findings

- By YE 1997, half said at least 50% of new PC purchases will be Pentium Pros.
- Corporate user plans by late 1997 include the following:
  - 150% increase in Windows NT
  - 50% decrease in Windows 3.X
  - 50% increase in Windows 95
- Within two years, the majority of internal application development will be 32-bit.
- Reliability, security, and performance are top reasons for choosing NT over Windows 95.
- Twenty-five percent of respondents will gradually roll out NT company-wide; 50% will roll out NT selectively.
- Key NT applications are general office, software development, technical/engineering, customized business, and multimedia.
- Performance and speed are top benefits of running NT on Pentium Pro PCs.
- Cost, hardware requirements, and incompatibility with existing software/peripherals key barriers to adoption.

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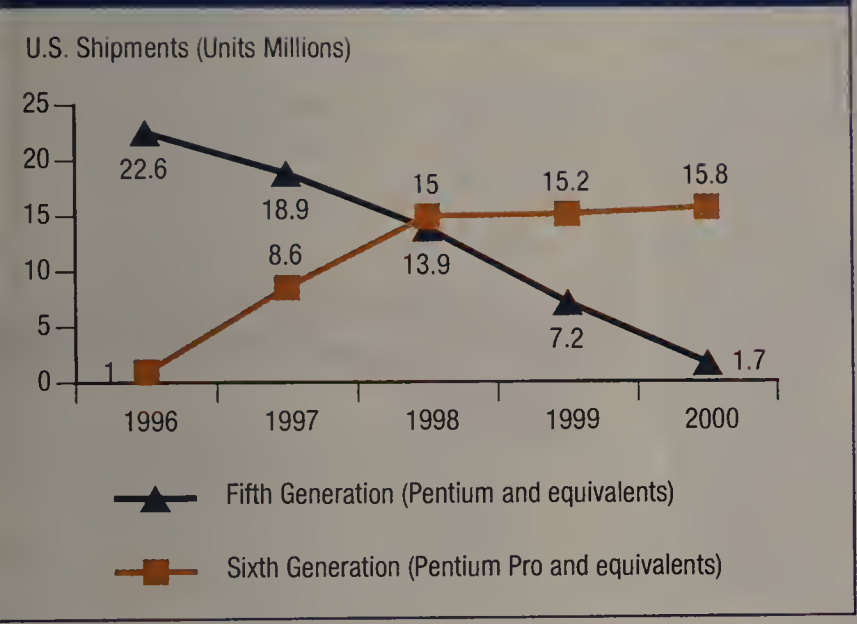
Next Generation PCs

Figure 1 – Pentium vs. Pentium Pro Processor Shipments



gain, IDC user research bears out corporate America's preference of Vindows NT over Windows 95 or any other OS. Corporate users ırveyed included in their 12-month plans a 150% increase in the se of Windows NT. They saw a decrease of Windows 3.X or Vindows for Workgroups use by about 50% and an increase of Vindows 95 by only 50%. Users cited reliability, security, perfor-nance, and robustness, in that order, as the most important reasons or choosing Windows NT over Windows 95. The primary depart-nents driving advanced desktop computer system purchases among DC respondents are MIS/DP, engineering, and R&D-traditional eading technologists, as might be expected. Somewhat surprising, are ne current applications users identified running under NT such as eneral office automation packages (word processing, e-mail, spread-neets) or today's general mainstream desktop applications (see igure 2).

Among corporations polled, the Pentium Pro was also the preferred latform to run NT. Fifty percent of respondents stated that at least alf of all their new PC purchases will be Pentium Pro systems by the nd of 1997.

The Call to Action

The decision of when and how to upgrade an IT infrastructure is diffi-ult and complex. Hesitating can be even more hazardous, possibly eading to forfeited opportunity costs and lost productivity. As we pproach 1997, it is clear that the U.S. corporate migration process to NT/Pentium Pro PCs is far beyond initial assessments.

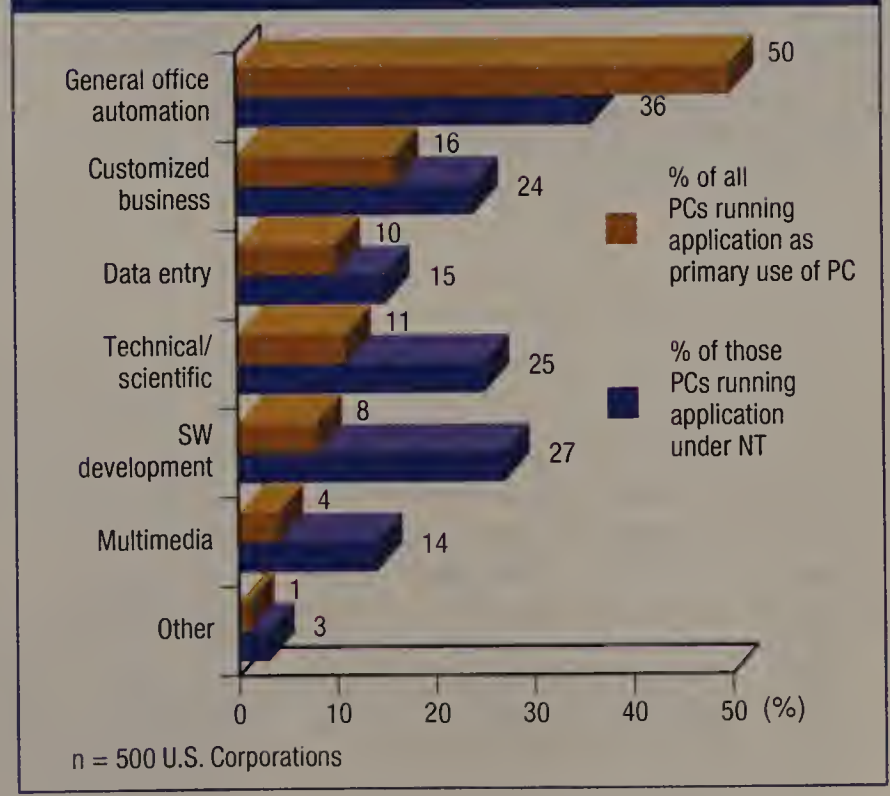
Perhaps the only thing as important as choosing the right advanced PC s choosing the right vendor partner behind it. The top criterion among the survey respondents were price/value and technical upport. IDC recommends users to look for PC vendors that push the price performance ratios and offer the most complete total value package. Closely examine what prospective vendors include in:

- Hardware (components, configurations, investment protection);
- Cost of ownership (virus protection, data and system management, real time diagnostics);
- Productivity enhancement (Internet/intranet, utilities);
- Vendor viability;
- Product quality and price/performance.

IDC predicts that 1998 will be the pivotal cross-over year when Pentium Pro outstrips Pentium U.S. sales overall, and NT surpasses Windows 95 on desktops within large corporations.

Given its total value, performance benefits, and headroom, the time for serious consideration of NT is here. The collective experience and insights of 1,500 corporate users—senior IT managers already in upward PC migration, can greatly benefit an organization's information technology design and planning.

Figure 2 – Current PC Applications, Share for NT PCs



This Insight was written independently by IDC and sponsored by AST Computer. For a complimentary copy of IDC's full White Paper on migrating to Next Generation PCs (Asian, European or U.S. versions available), please call AST at 1-800-447-0023 x 100 or check the AST Web site at http://www.ast.com

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56m†	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI

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Tiger ate my computer? ◆ Gateway's modem dilemma ◆ Kudos for askSam Systems

THE WAITING GAME

I SAW AN ADVERTISEMENT in *PC World* last June for a Cyrix build-it-yourself 6x86 kit, so I ordered a Cyrix P166+ kit from TigerDirect. I was told the kit would ship the next day, but it did not arrive until nearly four weeks later. I installed the hard drive, memory, and sound card from my old PC into the Cyrix PC, but the new system locked up and gave me a boot-disk error message. I called the third-party technical support provider in Canada, called Aegis. The technician took me through various checks and diagnostic tests. Still no luck. So I was promised a new motherboard; but four more weeks have gone by, I have a PC that still won't work, and I have not heard from Tiger.

Sam Arbuckle, Pensacola, Florida

Editor's response: We received eight other complaints from disgruntled consumers about Miami, Florida-based TigerDirect. The two most common problems: long delays in shipment of products and a slow turnaround on exchanges. We forwarded the complaints to Tiger and received a response from Adria Wood, customer service manager. Wood apologized for the slow service, and Tiger issued a return merchandise authorization number directly to Arbuckle. At press time Arbuckle confirmed that he had received a replacement unit from Tiger and it was working fine. His only gripe is about the two-plus months it took to resolve a problem that could have been solved in one day.

Wood says Aegis has handled technical support for the Cyrix 6x86 line since the products were introduced in May 1996. "Aegis was bombarded with calls about our new product, resulting in slow turnaround times and poor communication with Tiger," says Wood. Late last summer, Aegis hired additional service staff, installed a new telephone system, and upped its tech support hours. Aegis tries to return all calls within 48 hours, according to Wood. If that doesn't happen, however, you can now call TigerDirect directly at 800/888-4437, and Tiger will contact Aegis on your behalf.

HOW FAST IS MY MODEM?

I PURCHASED A P5-133XL from Gateway 2000 in November 1995 and have been having trouble with my modem ever since. It is supposed to be a 28.8-kbps modem, but I get only a 14.4-kbps connection with Wavenet, my Internet provider. I have spent hours on the phone with technicians from both Wavenet and Gateway. I've reinstalled the modem (as instructed by a Gateway technician) to no avail. The fastest connection I can get is still only 14.4-kbps. I contacted the phone company, which confirmed that nothing is wrong with the phone line. Strangely, Windows 95 identified the modem as a 14.4-kbps model. Is the modem faulty, or is it actually a 14.4-kbps modem and not 28.8 kbps as marked?

Sherri Camp, Central Point, Oregon

Editor's response: We forwarded Camp's complaint to Gateway, which contacted her, checked a few software settings, and promptly dispatched a replacement modem.

The old modem was sent back to Gateway, where it was tested and found to be defective, according to Carol Deeds, an executive response specialist. Camp confirms that the replacement modem works fine.

Our advice? If you experience difficulties connecting at high speeds, talk with the modem manufacturer and also contact your Internet provider and phone company for troubleshooting assistance.

ENLIGHTENED SERVICE

I WANT TO SHARE the experience I had with askSam Systems, makers of askSam Professional. This personal information manager and the customer support that goes with it are exceptional. At one point, the program's index feature kept crashing my system. askSam sent a patch immediately, and now the feature works perfectly. When I call tech support, I never get dumped into one of those endless voice mail mazes—I always reach a live person. In this age of large corporations, it's really cool to know there's one company out there with this level of customer relations.

S. Murugananda, Buckingham, Virginia

Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Aoife McEvoy is an assistant editor for* PC World. ■

THE FINE PRINT

ON-SITE SERVICE: DON'T COUNT ON IT

THIS QUANTEX AD boasts a new "Quantex Care Package." The highlight: a three-year "limited" warranty on the entire product line with one year of on-site service.

1. Although on-site service is part of the standard package, it isn't guaranteed. If you live in a remote area—defined as 100 miles from a Quantex service center or determined by your zip code—you have to send or carry your PC in for repairs. There are several hundred service centers across North America, most of them in cities with populations of 20,000 or more. Certain isolated pockets of Montana, Wyoming, Alaska, and northwest Canada are ineligible for on-site service.

2. Even if you live or work in a service area, there's no guarantee the company will dispatch an on-site technician. Incidents are reviewed case by case to ensure that all other solutions and "walk-throughs" over the phone have been exhausted.

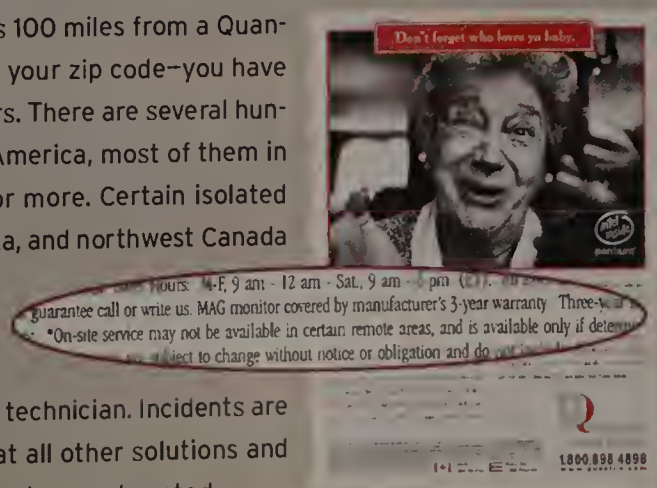

ILLUSTRATION: MICHAEL WITTE; ICON: JEFFREY PELO

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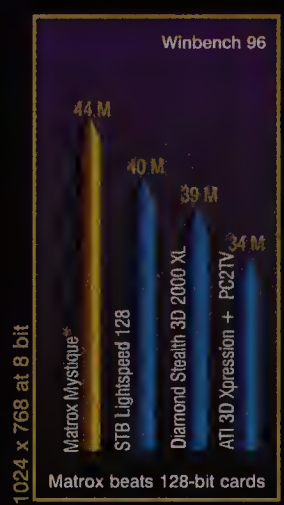

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[illegible] 96 [illegible] Direct 3D [illegible] sts conducted by Matrox Graphics [illegible] Gateway, P5-166 configured with Intel P5 166Mhz, 16MB of EDO RAM with 256K cache Matrox Mystique®, Diamond Stealth 3D 2000XL and ATI 3D XPRESSION [illegible] PC [illegible] PC [illegible] releases 3.16 4.03 [illegible] 21 [illegible] and 3.0 respectively for Windows 95 STB Lightspeed 128 was configured with 2.25 MB of memory using driver release 1.22 M WinBench 96 [illegible] tests conducted at 1024 x 768 [illegible] tests [illegible] Windows 95 [illegible] Microsoft Train Madness Microsoft Corp Microsoft Train Madness was tested in first person view, with dashboard off, map off sky texture on horizon on, smoke off [illegible] tracks [illegible] partners Test conducted at full screen 640 x 480 16 bit Score indicate maximum frame rate Direct 3D test done using Tunnel from the DirectX 2.0 SDK [illegible] sts [illegible] 12 x [illegible] 16 bit wide Matrox Mystique tests were conducted at 640 x 400 16 bit based on Gouraud shaded, perspective correct textured, point sampled, [illegible] pixel [illegible]

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Windows NT 4.0 patch ◆ Interim releases for Navigator and IE ◆ Smoother Descent

Microsoft, Netscape Fix Buggy Browsers

IF YOU'RE ONE of the zillions who downloaded Netscape Navigator 3.0 last August, you may have noticed that your .wav files don't warble and your Java doesn't jive. In the race to beat Microsoft's Internet Explorer to the Web, the final versions of Navigator 3.0 and Navigator Gold 3.0 shipped with several irritating, though nonlethal, bugs, which have been fixed in version 3.01. In both programs, the new version downloads and plays streaming audio files without requiring you to click on a start button. This interim release also solves a similar problem with some animated GIF files. In addition, it protects against nuisance HTML code that can cause Navigator and even Windows to freeze under previous versions, and fixes several glitches and potential security problems with Java applets.

As we went to press, both 16- and 32-bit versions of Navigator 3.01 and Gold 3.01 were available from Netscape's FTP server. For all Navigator 3.01 versions, check ftp://ftp.netscape.com/pub/navigator/windows/. By the time you read this, these versions may also be available at http://home.netscape.com/comprod/mirror/client_download.html.

Not to be outpatched, Microsoft almost simultaneously released Internet Explorer 3.01, which fixes problems that the first patch missed (see November 1996 *Bugs and Fixes*). The new version beefs up the program's security, fixes bugs with Java applets as well as with the America Online and CompuServe versions of the browser, and adds support for World Wide Web features in Microsoft Office 97. For additional information about 3.01's fixes, check http://www.microsoft.com/ie/ie3/newversion.htm#NEW301. If you'd like to read a list of outstanding problems, take a look at http://www.microsoft.com/IESupport/content/Issues/. You can download the Windows 95 and the Windows NT 4.0 versions of Internet Explorer 3.01 from http://www.microsoft.com/ie/download/.

WINDOWS NT 4.0 SERVICE PACK 1

IN MID-OCTOBER, with Windows NT Workstation and Server barely out of the chute, Microsoft released Service Pack 1. In addition to the cached write bug described in last month's column, the patch collection squashes nine other bugs, including fixes for sporadic data corruption in memory (particularly on Pentium Pro systems) and out-of-memory errors with Microsoft's Internet Information Server. The patch also deals with a bug that mistakenly moves compressed files stored on NTFS partitions when you attempt to copy them with a Windows 3.1 or Windows 95 version of File Manager.

For more information on the individual bug fixes in the Service Pack, which address problems in both Workstation and Server versions of Windows NT 4.0, check the readme.txt file included with the patch. You can download DEC Alpha, Intel, Mips, and PowerPC versions of this patch from Microsoft's Web site at http://www.microsoft.com/isapi/support/bldqpage.idc?ProductPage=q_servpk&ProductTitle=Windows+NT+Service+Packs, or from Microsoft's FTP server at ftp://ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/nt40/ussp1/ (the four processor versions are in the alpha, i386, mips, and ppc directories, respectively).

COLOR QUICKCAM 2.0.2

VIDEOCONFERENCING PIONEERS who use Connectix's Color QuickCam should grab the latest drivers and software from http://www.connectix.com/connect/upda.colo.html. Along with some new color-depth options that better support both the freeware and shareware versions of the CU-See Me Internet videoconferencing program, the 732K patch adds a filter that improves image quality in low-light situations; flip, mirror, and rotate options; and overall performance improvements.

If you find a hardware or software bug, post your report on PC World Online, or send us e-mail at bugs@pcworld.com.

IN BRIEF

Descent II 1.1 and Virge 3-D updates

IF YOU'RE A TRUE Descent II addict, you may have encountered one of these hardware-related problems: skipping audio with Adaptec SCSI adapters, CD-ROM drive errors in systems with multiple drives, and incompatibilities with Gravis Ultrasound and Matrox Millennium cards.

The 520K version 1.1 patch (d2ptch11.exe) fixes all these snags and more. But that's not all. If at holiday time you were one of the fortunate ones who received a new 3-D video accelerator board based on the Virge 3-D chip set, you'll definitely want to download the 1.2MB patch that enlivens the game with support for the board's 3-D acceleration. That file is d2virgep.exe. Both patches are available from Interplay's Descent II Web site at http://www.interplay.com/descent/descent2.html.

BUGGED?

LONG, CRYPTIC URLs bug you? Find links to patches mentioned in this column at http://www.pcworld.com/bugs/jan97.

ICON: JEFFREY PELO

THE HUMAN EYE

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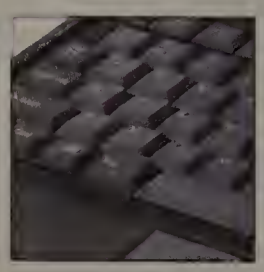

Designed for Microsoft® Windows® 95

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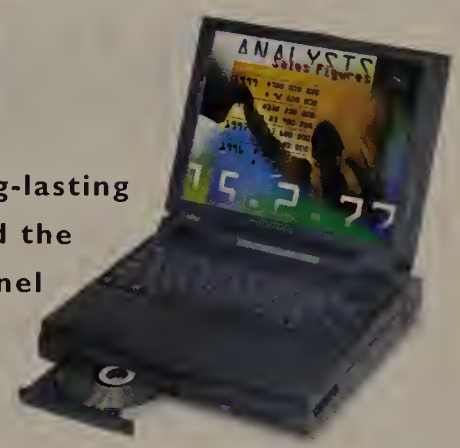

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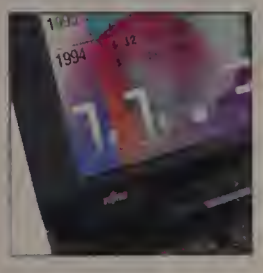

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INSIDE 53 Navigator 4.0 and Internet Explorer 4.0 | 54 Utilities Use Web to Update Your PC

TOP OF THE NEWS

TURBOCHARGE YOUR SOFTWARE

IN EARLY 1997 Intel will introduce a new generation of Pentium processors that should significantly boost the performance of multimedia and communications features. Intel claims the new processors, called MMX, can improve software performance by up to 60 percent over standard Pentiums running at the same clock speed. Systems using MMX processors will appear concurrent with the CPU rollout. The drawback: To see really dramatic benefits, software must be customized for the new technology.

PC World tests show Intel's upcoming MMX Pentiums should significantly improve PC-based multimedia and graphics. Will software vendors support the new scheme?

Intel will convert its desktop and notebook Pentium processor lines to MMX technology over the next year, forcing users to make some decisions. Must your next PC have an MMX-capable Pentium CPU? And if so, should you switch from your current software and CD-ROM titles to products that harness MMX?

THE FIRST MMX APPS

TO ANSWER these questions, *PC World* took a look at some of the first MMX software to hit the market. Our findings: An MMX processor, coupled with MMX-aware applications, can make a big difference in key multimedia operations such as image manipulation and 3-D rendering. However, the overall impact varies widely according to how much an application depends on MMX-enhanced operations, and how aggressively it takes advantage of the technology. Ultimately, MMX provides a platform for more realistic game play, better video playback, and more powerful graphic features.

NEW INSTRUCTIONS

FOR THE FIRST time since the introduction of the 80386 in 1985, Intel has added to the base set of instructions that are the lowest common denominator of Windows and DOS applications. MMX-enhanced CPUs add 57 instructions to those in Pentium CPUs, so MMX CPUs need only one step to complete certain operations that take standard CPUs dozens of steps.

The catch is, current software cannot access the new instructions—vendors must add MMX-aware code to accelerate their applications. That task is arduous, so MMX technology is most likely to show up in new software, or in apps like Adobe Photoshop that accept plug-in modules.

Intel will introduce 166-MHz and 200-MHz MMX-enhanced Pentium processors for desktop PCs, as well as 150-MHz and 166-MHz lower-voltage MMX CPUs for notebooks. MMX-equipped PCs should be available immediately after the rollout. Intel plans to release MMX Pentium OverDrive chips in the second half of 1997.

Some MMX applications, such as Ubi Soft's Pod racing game, won't run at all on non-MMX PCs, and will appear only preinstalled on MMX machines. But as MMX systems become ubiquitous, optimized—and incompatible—MMX versions of software could end up on store shelves, inviting confusion.

Even without custom applications, MMX systems will give existing software an immediate performance boost—as much as 20 percent, Intel claims. That's because the MMX chip has 32K of high-speed internal cache, twice as much as the current Pentium. This cuts the time spent accessing slower main memory and secondary cache. Moreover, Intel has improved the pipelined architecture to reduce performance-sapping wait states.

Microsoft has MMX support in the current OSR2 version of Win 95 that's bundled on new PCs. Key components such as the ActiveMovie media player and the Direct3D module have been updated for MMX, as has the DirectX 3.0 technology for Windows 95 games.

TESTING, 1, 2, 3

WE PREVIEWED early MMX software, installing an MMX beta version of Adobe Photoshop 4.0 and a beta gold version of Fractal Design Ray Dream Studio 4.1 onto a shipping-level PC with an MMX Pentium-166, 512K of secondary cache, and 32MB of EDO DRAM. We timed several graphically in- ▶

EDITED BY
Russell Glitman and Randy Ross

ILLUSTRATIONS, LEFT: DAVID KAHL; RIGHT: JEFFREY PELO

JUST IN

WinZip: Net Necessity

WINZIP 6.2 GOES beyond its traditional role as a shareware compression utility and adds critical Net tools such as UUencode, MIME, and BinHex decoding, so you can read those mysterious e-mail attachments. WinZip 6.2 also includes the Self-Extractor Personal Edition for creating self-extracting files that you can distribute (in .exe format). Version 6.2 is available in Windows 3.1 and 95/NT flavors, and you can download a free 600K evaluation copy from WinZip's site (http://www.winzip.com) or from PC World Online. Registration fee is $29; registered owners of previous versions are eligible for a free upgrade.

First 200-MHz Notebook Underwhelms

EUROCOM'S 6200 Super-Notebook is the first Pentium-200 notebook we've tested, and it's about 5 percent slower than the fastest P-133 notebook we've tested. For $4610, you get 16MB of RAM, a 1.08GB hard drive, a 12.1-inch active-matrix screen, an 8X CD-ROM drive, and a 28.8-kbps modem.

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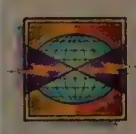
AMERICA ONLINE has new pricing: $19.95 a month for unlimited access, $14.95 a month for ▶

INTERNET



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MMX Software Rollout: First Titles Focus on Graphics and Games

COMPANY	Product	Price	Due	Features	Web site	Reader service no.
Adobe	PhotoShop, PhotoDeluxe	$895 list, $49 list	now	Image transformations like blurs and filtering boost photo editing applications.	http://www.adobe.com	806
Asymetrix	3D F/X	$70 street	now	Web and graphics design tool.	http://www.asymetrix.com	807
Books That Work	Visual Home	$60 list	January	Home CAD program with faster solid modeling.	http://www.btw.com	808
Byron Preiss Multimedia	Timetables of Technology	not available	January	Explore technology with rendered 3-D objects.	http://www.byronpreiss.com	809
Dorling Kindersley	Ultimate Human Body	$40 street	January	See the human anatomy with interactive 3-D models.	http://www.dk.com	810
Epic MegaGames	7th Legion	under $50 list	March/April	16-bit color and 3-D graphics in military game.	http://www.epicgames.com	811
	Jazz Jackrabbit II	$39 list	March/April	Side-scrolling arcade game.		
	Unreal	not available	May/June	Quake-like shooter boasts fast 3-D interaction.		
Fenris Wolf	Rebel Moon Rising	not available	January	Sequel to Rebel Moon boasts fast 3-D navigation.	http://www.fenriswolf.com	812
Imagination Pilots	Eraser-Turnabout	$60 street	January	Schwarzenegger gets MMXed in this shoot-'em-up.	—	813
Maris Multimedia	Space Station Simulator	$46 street	January	Help build and manage international space station.	http://www.maris.com	814
Mediamatics PureSpeech	MPEG player	OEM only	January	MMX MPEG player boosts frame rates, quality.	http://www.mediamatics.com	815
Ubi Soft	Pod	OEM only	January	3-D street racer gets fast graphics from MMX.	http://www.ubisoft.com	816

tensive operations, then replaced the MMX chip with a standard P-166 processor and repeated the tests.

In certain operations, the MMX CPU delivered a clear performance advantage, such as when running a Gaussian blur (which creates a hazy effect). When we applied a Gaussian blur to a TIF image file in Photoshop, MMX boosted performance 143 percent, from 51 seconds to just 21 seconds. Increasing image size improved by 33 percent with MMX. When we redrew 3-D scenes, Ray Dream Studio sped up Gouraud and Phong shading about 21 and 27 percent, respectively.

Performance improved a scant 3 percent in the rotate-canvas operation in the beta MMX Photoshop. Mundane operations such as saving and opening files saw no gain.

With MMX's focus on multimedia and graphics, it's not surprising that many of the first applications are games. In fact, Intel expects MMX to appear in home PCs soon, while many business units will use the standard Pentium CPU through the first half of 1997.

Vendors such as Fenris Wolf, Maris Multimedia, and Ubi Soft will release MMX-savvy games. These titles use MMX to provide detailed 3-D graphics and smooth animation not possible with today's Pentiums. Ubi Soft's Pod has fast 15-to-30-frame-per-second animation on a detailed 3-D race track. Mediamatics, meanwhile, will ship a software video decoder that plays high-resolution MPEG-2 video.

Intel says MMX print drivers should help boost color printing speeds, while graphics chip makers say they'll combine MMX with extended video-accelerating hardware to provide MPEG-2 video playback at 30 frames per second.

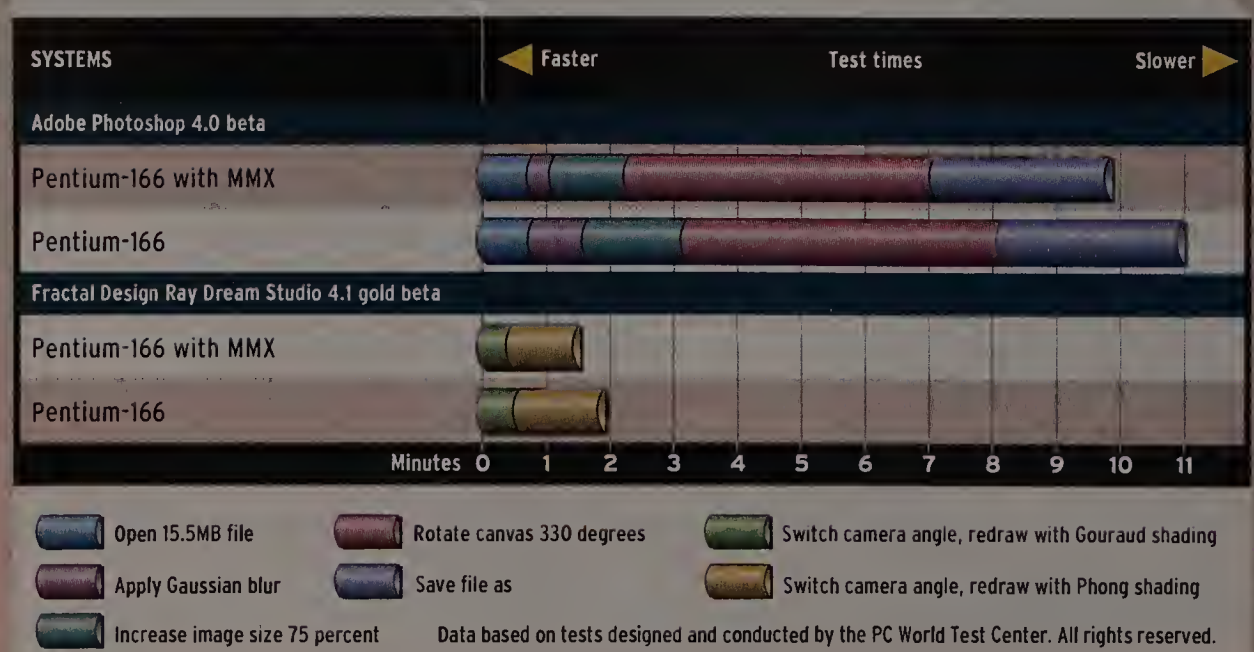
Does MMX deliver? Developers may take some time to work MMX into their products, but the technology clearly boosts performance for a wide range of software. More important, MMX invites vendors to extend features and capabilities, adding richer 3-D animation and higher video frame rates. With Intel committed to making MMX a standard part of its Pentium and Pentium Pro CPUs, and competitor Cyrix planning a compatible MMX-style chip, the market seems poised to make the transition.

—Michael Desmond

TEST REPORT

MMX Speeds Up Graphics

Most dramatic improvements are seen in image editing.



Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Navigator and Internet Explorer Take Different Approaches to the Web

FIRST LOOK

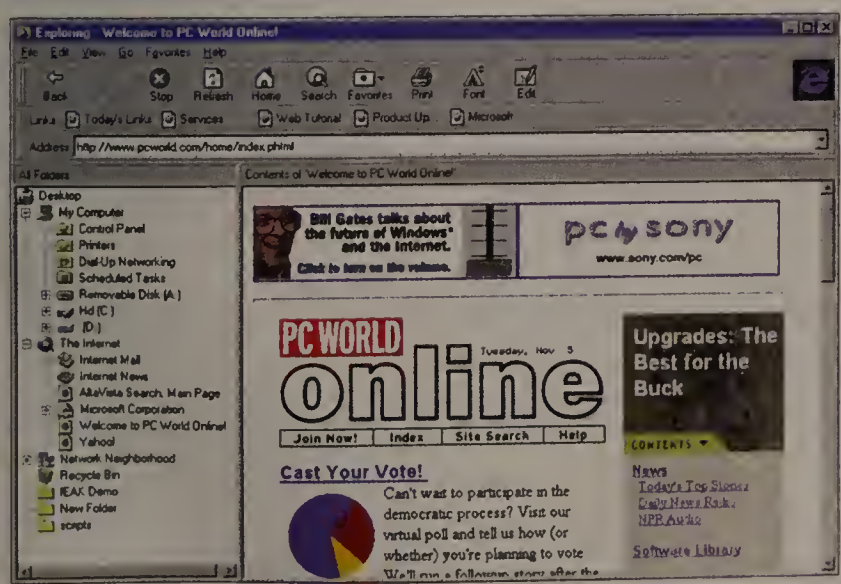
THE BROWSER IS being redefined in the next versions of Netscape's Navigator and Microsoft's Internet Explorer. While Microsoft is integrating its browser into Windows, Netscape is giving Navigator a not-so-prominent role in a new groupware line. Here's what to expect based on pre-beta copies of Navigator 4.0 and Internet Explorer 4.0.

NAVIGATOR GOES GROUPWARE

NETSCAPE'S $49 Communicator Standard Edition Suite includes Navigator 4.0, as well as Messenger, an e-mail program that runs over LANs and the Internet; Collabra, a tool for creating public and private discussion forums; Composer, a simple HTML editing tool; and a reworked version of Netscape's CoolTalk Internet telephone and conferencing program. A more advanced version of the suite—the $79 Communicator Professional Edition—adds group calendaring and a set of administration tools. Netscape will not offer Navigator 4.0 separately. Beta should be downloadable at http://www.netscape.com in December. Final versions should ship in early 1997.

Navigator 4.0 is expected to address many usability beefs. The early version we saw had bookmarks that let you file URLs into customized folders. (Currently, you must save a URL, then go back and move it to a specified folder.) The interface is elegant and more customizable than before. You can display buttons and icons for the functions you want to use and hide the others. The Taskbar, which goes at the top or the bottom of the screen, lets you jump with a mouse click between Navigator and other parts of Communicator. Finally, a new automated installer should make it easier to configure plug-ins.

NAVIGATOR 4.0's toolbar is more elegant and customizable than in prior versions.



INTERNET EXPLORER 4.0 has a Windows 95 Explorer view of your data and the Web. The right pane changes dynamically when you load an app.

IE GOES DESKTOP

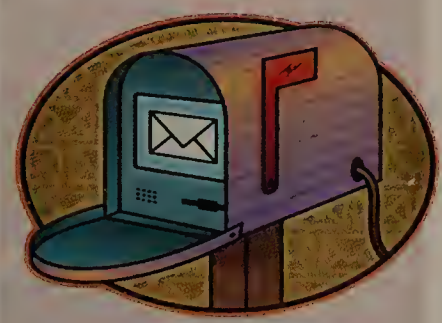
WITH VERSION 4.0, Microsoft has dramatically souped up Internet Explorer and positioned it as a major link in the evolution of its Windows operating system.

Integration between the desktop and the browser allows you to manage files (copy, delete, view, and so forth) and edit documents from the browser, as well as surf the Web. The screen is split into two sections. The left pane displays a Windows 95 Explorer view of your system and the Internet. A View pane on the right shows either a Web page, a Word or Excel document, or a standard folder with file icons. The toolbar changes dynamically to suit what's in the View pane—giving you a Word toolbar when you're editing a document, for instance, and an IE toolbar when you're surfing the Web. A beta version of Internet Explorer 4.0 should be available in December at http://www.microsoft.com; the product is expected to ship in the first quarter of 1997.

Judging by the features and design of these early versions, Microsoft has the advantage over Netscape in the browser wars. Besides, it's free.

—*Yael Li-Ron and Randy Ross* ▶

two years paid in advance, and $17.95 a month for one year paid in advance. AOL joins Microsoft Network, AT&T, and SpryNet, which already offer unlimited Internet access for $19.95 per month. Prodigy also jumped on the flat-rate bandwagon launching its Prodigy Internet 1.0. Web service. For $19.95 a month, users get unlimited access to the Internet and to members-only Web sites that include chat rooms and bulletin boards.



Do Ergo Keyboards Help?

ERGONOMIC KEYBOARDS don't necessarily increase user performance or efficiency or decrease the risk of repetitive strain injuries, according to *CTD-News*, a monthly ergonomics newsletter. Worse, typists with small hands may actually increase their risk of RSI by stretching their fingers across the keyboard, according to the report. However, ergonomists contend the keyboards can help.

Pentium on a Belt

XYBERNAUT'S NEWEST wearable PC, the Mobile Assistant II, packs a Pentium-75-class chip, 16MB of RAM, a 1.2GB hard drive, and two PC Card slots into a 3.5-pound device that fits on your belt. A 12-ounce head-mounted 640 by 480 monochrome display is suspended in front of one eye. The head mount includes a noise-canceling mike and earphone. The Mobile Assistant uses voice recognition for hands-free access to Win 95 ▶

ILLUSTRATION: JEFFERY PELO

Rx for Your PC: Utilities Use the Web to Prescribe Software Updates and Fixes

PCS ARE STILL notoriously difficult to use and support. To address this issue vendors are introducing "intelligent utilities." These products use the Web to update your PC with the latest software and drivers and attempt to prevent or fix common problems that used to require a call to tech support. We examined several promising stand-alone products. Next year, expect to see these and similar utilities bundled into new PCs.

CyberMedia's $40 First Aid 97 improves in many ways on its predecessor, First Aid 95. Besides having a better interface, First Aid 97 is more effective. A prerelease version found and fixed a raft of minor Windows 95 problems on my PC, such as nonworking Windows 95 Shortcuts. Cybermedia claims the product can fix thousands more problems than the previous version. Of course, First Aid 97 cannot fix true hardware problems such as a bad hard disk. But it can connect to the Web to update older versions of some critical software on your system, such as device drivers, and outdated Windows 95 system (but not application) files.

Oil Change, CyberMedia's complementary $30 product, is designed to keep your PC software—including drivers and applications—up-to-date. Oil Change scans your system and develops an inventory of your software and drivers. Each time you run it, the product connects to Cybermedia's database via the Web and checks for new versions and bug fixes. Then it automatically downloads and installs the updates. Oil Change handles updates for itself and hundreds of popular products, including major software applications and device drivers.

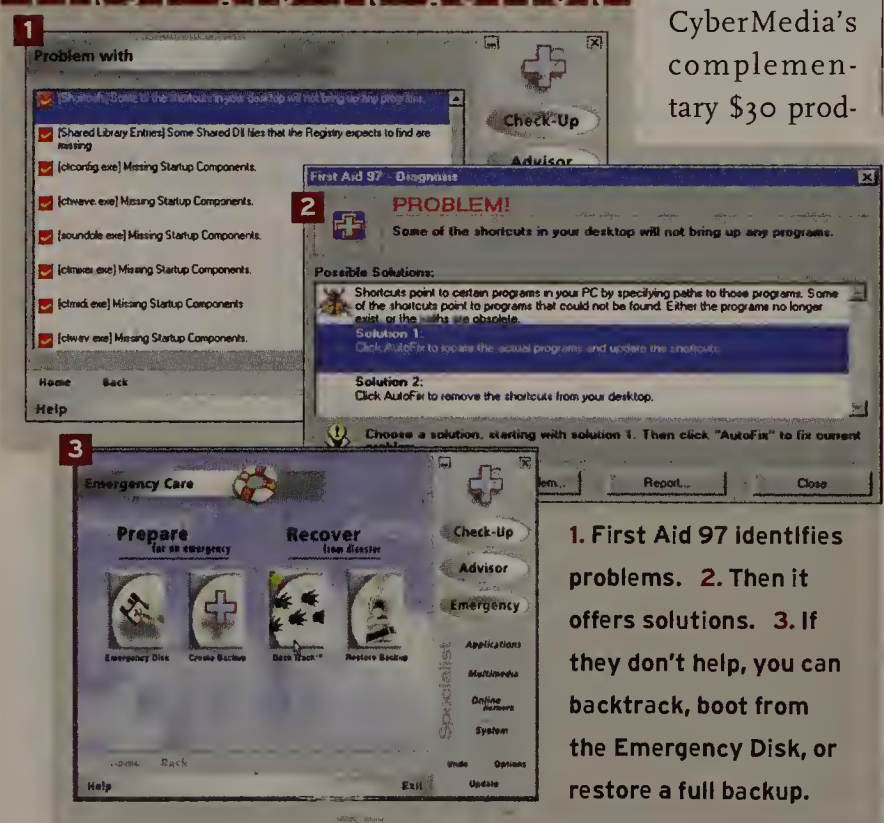
NetSync's WebPatch competes with Oil Change and takes a different tack. NetSync charges vendors who want to provide updates, so WebPatch is free to users via the Web. (Corporations are charged a one-time fee of less than $20 per user.) It also "patches" existing software, instead of replacing it, which should saves both Web connect and update time. The prerelease version of WebPatch that I tested showed promise, but the jury is still out. The product could not detect my configuration, though the company expects to add that capability soon. WebPatch is not as comprehensive as Oil Change. For example, it lacked drivers for my Diamond graphics card. NetSync says the final version will include more patches.

Symantec's PC Handyman includes two notable components. Like First Aid 97, Norton CrashGuard With Anti-Freeze works continuously in the background and is designed to fix common Windows 95 system and driver problems as they occur. It did not, however, find many of the (admittedly minor) problems that First Aid 97 caught immediately. PC Handyman also includes a CD-ROM with over 140 instructional video clips that offer help on resolving tough problems and installing new hardware. Although you can update PC Handyman over the Web, there's a major limitation: The utility does not check for outdated software and can't update old drivers and other system software that frequently cause problems.

Although diagnostic and update utilities are improving, there will always be problems that require a call to tech support. Still, after examining these prerelease utilities, we feel this new family of programs has merit. In particular, CyberMedia's First Aid 97 and Oil Change appear to offer the most potent combination for both fixing problems and keeping your software current.

—*Stan Miastkowski*

FIRST AID IN ACTION



1. First Aid 97 identifies problems. **2.** Then it offers solutions. **3.** If they don't help, you can backtrack, boot from the Emergency Disk, or restore a full backup.

First Aid 97

PRO: Much improved over past version.
CON: Might slow down older PCs.
VALUE: Can pay for itself.
Street price: $40

Oil Change

PRO: Keeps software current.
CON: Updates can be slow.
VALUE: Quickly pays for itself.
Street price: $30 per year
CyberMedia
800/721-7824
http://www.cybermedia.com
READER SERVICE NO. 802

PC Handyman

PRO: Comprehensive features and instructional videos.
CON: No integrated way to update system software.
VALUE: Geared for novice users.
Street price: $49
Symantec
800/441-7234
http://www.symantec.com
READER SERVICE NO. 803

WebPatch

PRO: Patented patching technology makes updates fly.
CON: Limited updates.
VALUE: Can't beat the price.
Price: Free from company Web site
NetSync
888/932-7282, 619/438-0176
http://www.webpatch.com
READER SERVICE NO. 804

MagnaRAM 97 Saves a Bit of Time Loading Win 95 Apps

QUARTERDECK'S $30 MagnaRAM 97 is the first Win 95 RAM-enhancement utility we've tested that truly speeds performance, though the benefit is limited to improving the time it takes to open apps. Previously, we found this class of software tended to hinder overall performance. Still, most Win 95 users should consider adding RAM instead.

Unlike products we tested before, MagnaRAM 97 is designed to make the most of existing RAM on Win 95 PCs. The vendor says its new compression technology crams more data in RAM, where it can be accessed faster than if stored on the hard drive in virtual memory. Quarterdeck claims MagnaRAM 97 speeds the loading of 32-bit apps and runs them faster on Win 95 PCs with 16MB or more RAM.

We tested the product on a Pentium-90 PC running Windows 95 and got mixed results. With MagnaRAM 97, a 16MB system loaded common 32-bit applications up to 42 percent faster than the same system without MagnaRAM. In its finest performance, the 16MB MagnaRAM PC loaded Excel 7.0 in about 4.7 seconds, while the 16MB PC without it took about 6.7 seconds. Word 7.0 and Picture Publisher 6.0 also loaded faster with MagnaRAM, but improvements were less dramatic. On a PC with 32MB of RAM, MagnaRAM loaded our test apps up to 21 percent faster than a PC without MagnaRAM did. However, we saw that improvement only after opening and closing apps repeatedly and performing other tasks to simulate heavy use.

In tests involving basic tasks with common apps, such as opening files and manipulating large, memory-hogging graphics, MagnaRAM's impact was insignificant. Worse, adding the program to a 16MB system slowed down some graphics-intensive tasks.

The upshot: In certain situations, MagnaRAM can speed performance. If your system has 32MB of RAM and you open apps often, MagnaRAM can save you time. If you've got 16MB, open apps repeatedly, *and* use large, highly compressible files, MagnaRAM also can help. Most users, particularly those with 8MB or 16MB PCs, are better off adding more RAM.

—*Shane Rau* ▶

Quarterdeck MagnaRAM 97

PRO: Applications open faster under 16MB and 32MB.

CON: Apps don't run any faster.

VALUE: Best for power users with 32MB machines.

Street price: $30 with $10 rebate

Quarterdeck

800/354-3222, 310/309-3700

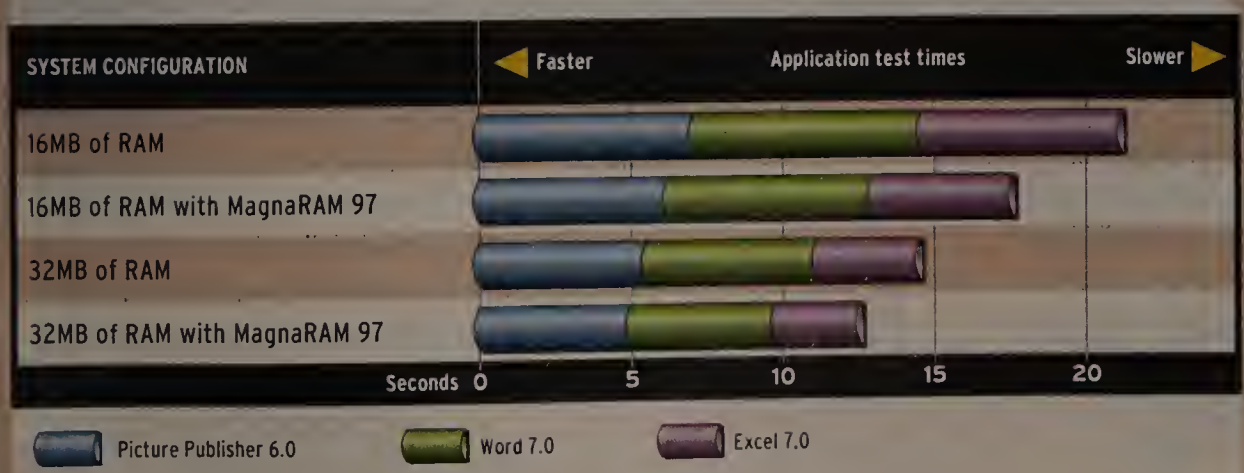
http://www.quarterdeck.com

READER SERVICE NO. 805

TEST REPORT

MagnaRAM 97 Opens Apps Faster

Benefits both 16MB and 32MB systems.



HOW WE TEST We ran all tests on a Micron Millennia P90 with a Pentium-90 CPU. For each application load test, we created and selected a Shortcut icon for the app, pressed <Enter>, and recorded the time it took to load completely. The Excel load test was conducted with Word already loaded. 16MB times represent average of three trials with reboot between each trial; 32MB times average three consecutive trials. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

ILLUSTRATION: JEFFREY PELO

applications. The $7995 device has a full array of ports. Xybernaut is at 703/631-6925.

Two Hot Technologies

IBM HAS DEMONSTRATED a technology that puts more on a tiny screen than any method we've seen. Using the technology, a 1.4-inch display projects an image onto a mirror, which magnifies the image so it looks as if it's on an 11-inch VGA monochrome screen.

The personal area network uses nearly imperceptible electric body currents to move data. You could exchange electronic business cards via a handshake or transfer a phone number from your pager to a cell phone. IBM demonstrated a transmitter and receiver, each the size of a deck of cards, that may be combined into one unit. No word on cost or when a product may ship.

TidBytes

ONE MODEM, Two High-Speed Upgrades: Cardinal's new 33.6-kbps analog modems are upgradable to 56-kbps and ISDN. They come in three versions—external ($170), PC Card ($200), and internal ($150). The 56K upgrade should require only software; the ISDN upgrade needs the $80 Upgrade Option kit. All are expected in early 1997. **20MB on a Business Card:** Iomega is creating a new disk format, n-hand, that's half the size of a business card and costs about $10 for 20MB. Look for products with n-hand disks in the second half of 1997.

Road Troubles: Fast-Moving Technology Causes Notebook Breakdowns

WON'T HOLD A CHARGE: Jesse Cornell's new Toshiba notebook came with battery problems.

CONSUMER ALERT

ADVANCES IN technology and design are making notebook PCs more popular than ever. But experts say vendors increasingly sacrifice quality in order to meet stiff price competition; shorter product cycles; and consumer demand for smaller, lighter designs. As a result, more and more buyers are complaining about flaws ranging from marred active-matrix displays to bum batteries.

Jesse Cornell of Bossier City, Louisiana, is a case in point. He bought a Toshiba Satellite Pro so he could work on the road and exchange e-mail, but found that the system's battery failed to keep a charge when the notebook was shut down and left unplugged overnight. Fortunately, his machine was still under warranty.

SPREAD THE BLAME

THE INCREASE IN notebook problems is easy to explain, says Andrew Seybold, editor of the newsletter *Outlook on Communications and Computing:* "Blame it on Intel." Presented with three new notebook Pentium processors in the first nine months of 1996, notebook vendors have had less time for troubleshooting. Product cycles that formerly lasted ten months now run six months or less, says Seybold.

> The increase in problems is easy to explain: "Blame it on Intel," says Andrew Seybold.

It's not just second- and third-tier vendors that are having these problems, says Ken Dulaney, vice president of mobile computing for The Gartner Group, a research firm. "We first noticed [problems] six or seven months ago. It began with Compaq having a lot of trouble with notebooks, and then we started to hear problems from Dell, NEC, and Toshiba."

To complicate matters, notebook vendors rely on offshore manufacturers, particularly in Taiwan and Malaysia. Asian manufacture is hardly new—the Taiwanese company Acer builds Apple's PowerBooks and Texas Instruments' Extensa 400 systems. But doing business with companies overseas can be tricky. Texas Instruments recalled many of its Extensa 500 notebooks after hard drives in the units made in Taiwan failed. The explanation: Texas Instruments' Taiwanese supplier, First International, used tin connectors instead of gold. Analysts say that problems often arise because companies fail to actively manage their offshore manufacturing operations, leaving oversight to their partners.

AVOIDING TROUBLE

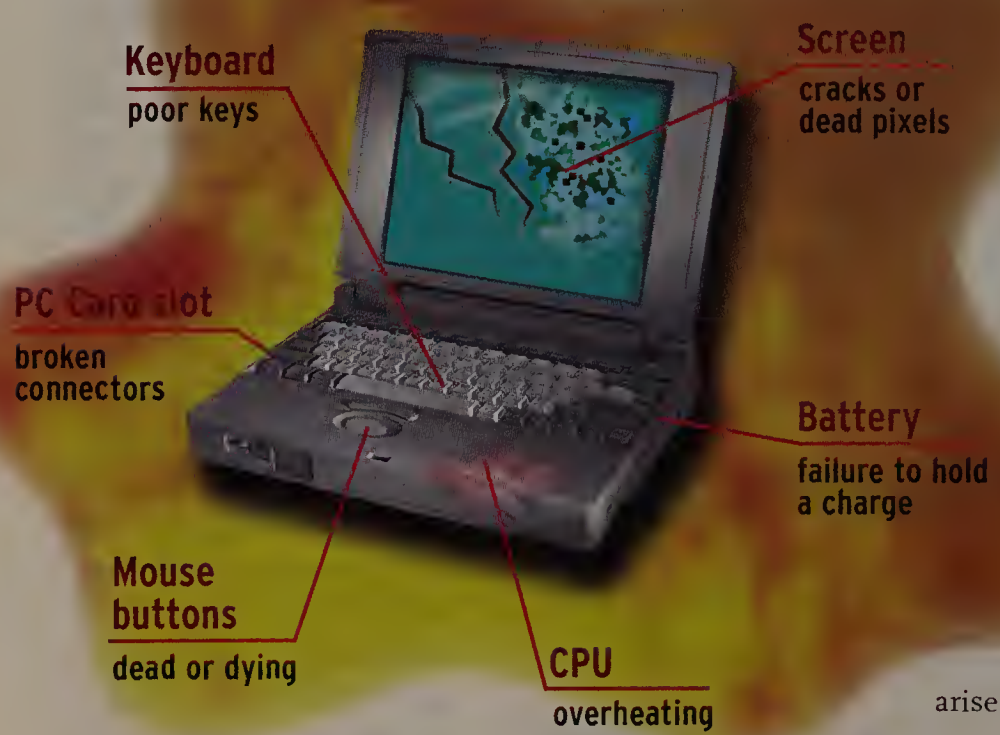
NOTEBOOK PROBLEMS may be on the rise, but you can avoid them. The best strategy: Stay away from the cutting edge. Depending on the application, a 133-MHz notebook with 32MB of RAM can match or even exceed the performance of a 150-MHz model with 16MB of RAM. The vast majority of applications run very nicely without the expensive 12.3-inch and 13.1-inch displays, which are more prone to cracking and pixel failure.

New thin-and-wide notebooks are more susceptible to damage from torque and impact than heftier models. Inspect your system thoroughly when you receive it. Examine the display for "dead" pixels that don't match others nearby; check the display hinge, the port doors, and the keys on the keyboard to confirm they all feel solid. While there's no guarantee your notebook will run problem-free, these precautions should cut your risks.

—*Michael Desmond* ▶

Problems on the Rise for Notebooks

Components that users and analysts report are most prone to failure.



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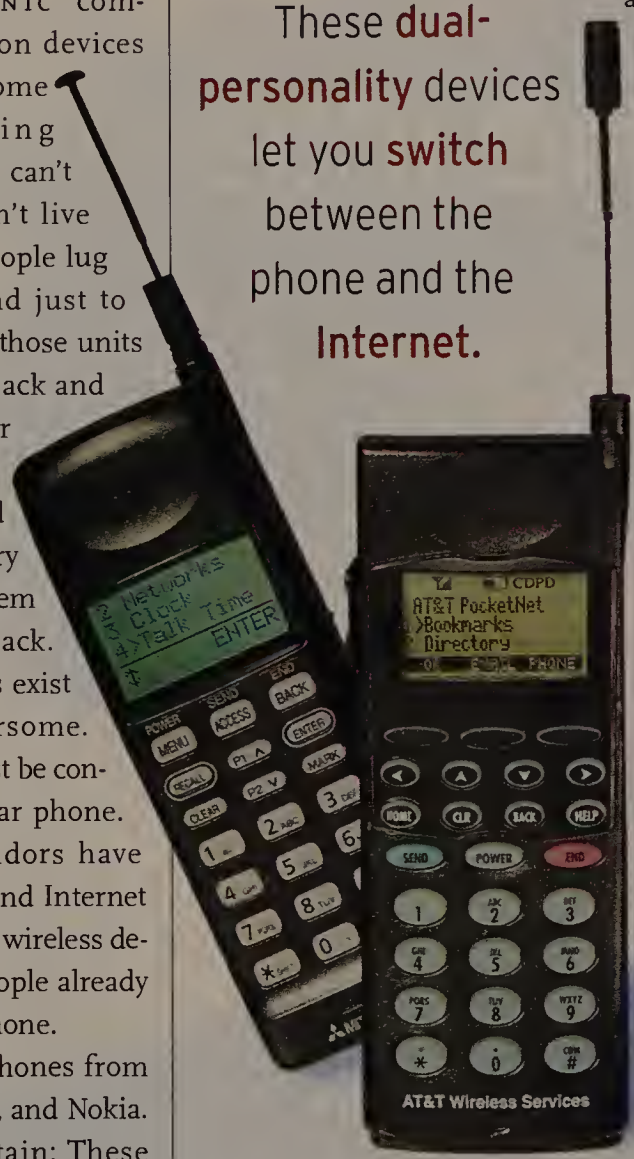
Circle 10 on reader service card

Internet for the Jet Set? New Cell Phones Dial Up for E-Mail, Fax, and Net Access

ELECTRONIC communication devices have become something business travelers can't live with and can't live without. Many people lug notebooks around just to check e-mail, but those units require a phone jack and often need a power source too. PDAs weigh less and have longer battery life, but most of them require a phone jack. Wireless modems exist but are cumbersome. Typically, they must be connected to a cellular phone. Now several vendors have built e-mail, fax, and Internet access into a small wireless device that many people already carry: a cellular phone.

We examined phones from AT&T, Mitsubishi, and Nokia. One thing is certain: These products won't replace your notebook for the most demanding e-mail, Net, and fax tasks, nor were they meant to. Entering data on the tiny keyboards and reading messages on the mini screens can be as tiresome as using palmtop PCs. But these devices let you tap a wealth of information—much of it on the Web—and send and receive e-mail from just about anywhere a wireless service can reach you.

These **dual-personality** devices let you **switch** between the phone and the **Internet.**



WEB CALLING: Mitsubishi's MobileAccess, left, and AT&T's PocketNet link you to the Net.

FIRST PHONES

AT&T'S POCKETNET and Mitsubishi's MobileAccess devices should be available by the time you read this. These dual-personality units—virtually identical in features—let you switch between phone and Internet features with the push of a button. In Internet mode, they communicate over a cellular digital data service called Cellular Digital Packet Data. Almost half the people in the United States have access to CDPD service, with 54 cities offering full coverage.

The phones are a tad larger and more expensive than today's cellular phones. They weigh somewhere between 10 and 13 ounces, measure 6 inches long, and sell for $500 to $600—considerably more than their voice-only counterparts. In addition, AT&T Wireless charges a $30 to $40 monthly premium for the data service.

Composing e-mail on these phones is tedious because of their miniature keypads. As on standard phones, each key has three or four letters; for example, the 2 key has the letters *A*, *B*, and *C*. To enter a *C*, you have to press the 2 key three times. Reading messages is less challenging. Each of the phones has a small four-line screen, which is adequate for viewing short messages. Reading longer e-mail messages is cumbersome but possible. Long incoming messages are automatically broken up into 1400-character batches—the maximum size for a message. You can forward long messages to a local fax machine. You can't read e-mail file attachments. Messages are stored on the provider's network.

We were impressed with the phones' ability to provide quick access to Web sites designed for the small display. These sites contain no graphics and consist only of menus of selectable text items. The Web pages are created with a variant of the Web's HTML code called HDML (Handheld Device Markup Language). The menu system for both phones is easy to use. We were able to check the local weather, find movie locations, and have articles in national newspapers e-mailed to us—in each case by using only a few keystrokes.

Currently HDML pages are limited to those that are developed by certain cellular service providers, such as AT&T. However, those providers will allow businesses to create their own pages.

NOKIA'S PALMTOP CELLULAR PHONE

AVAILABLE IN Europe and scheduled for launch in the United States later this year, Nokia's 9000 Communicator incorporates the greatest number of PC features and offers a glimpse of the direction this technology is taking. The unit looks like a conventional cellular phone, but it opens like a clamshell to reveal a palmtop computer with a 65-key QWERTY keyboard and a 640 by 200 LCD screen. It's powered by an Intel 386 processor, includes 8MB of memory, and uses the GEOS operating system. It comes with several miniapplications, including a contact list, a calendar, and a notepad.

Because of its larger screen and keyboard, the Communicator is superior to the AT&T and Mitsubishi phones for managing e-mail. The e-mail applet is straightforward, and the keyboard is as easy to use as most you'll find on palmtops. Like the AT&T PocketNet and Mitsubishi MobileAccess phones, Nokia's 9000 Communicator allows you to forward messages to a fax machine, but this function is more awkward than with its competitors: You have to copy and paste the message in- ▶

PHOTOGRAPHS: JOHN GREENLEIGH

It's your business.
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Introducing the new HP Colorado T3000 Tape Drive.

- Up to 3.2 GB* capacity at an affordable price
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- One-Button Backup makes it quick and easy

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If you were to take stock of all the information stored on your PC, you'd soon realize how vital it is to your business. What if one day all that information vanished? Accidents happen. Theft, fire, floods, computer failure or human error can result in a devastating loss of data. The cost of rebuilding that data can be massive and often impossible. Few businesses survive it.

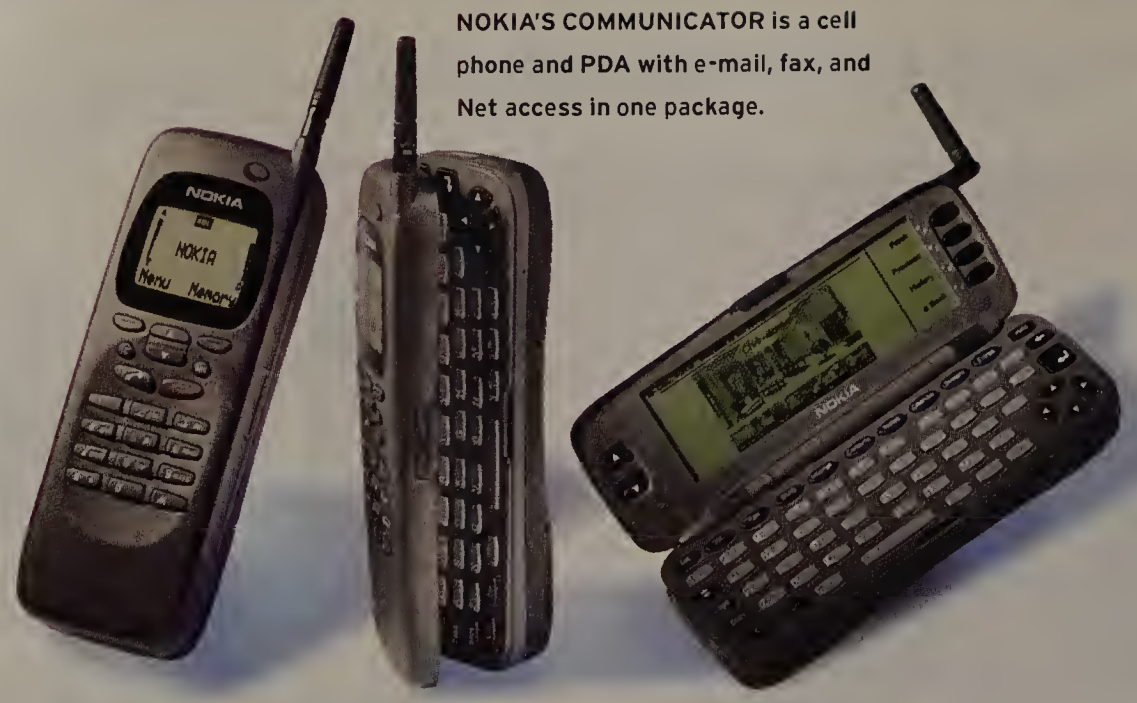
Regular backups using a reliable HP Colorado tape backup system are your best insurance that, should disaster strike, you're back up and running in minutes.

With award-winning Colorado Backup for Windows 95 software included in every HP Colorado drive, data protection simply doesn't get any easier. And nothing is more reliable. What could be more important than that?

Your business depends on your data. You can depend on HP Colorado to look after your data. Visit your dealer or call **1-800-826-4111 ext. 2011** for more information. HP Colorado Tape Storage. A store you can trust.

Designed for Microsoft Windows 95

* Maximum capacity using 2:1 data compression



NOKIA'S COMMUNICATOR is a cell phone and PDA with e-mail, fax, and Net access in one package.

to a fax form for forwarding. Unlike the other phones, the Communicator has a fax client, so you can send, receive, and view faxes.

The Communicator is the only device we examined to provide a real graphical browser that lets you access any Web site directly. At this point, however, it's crude compared to PC-based browsers—for example, it doesn't support Java or plug-ins. And downloading Web pages takes forever because the link is only 9600 bits per second. Moreover, most graphics look dull on its screen, which shows only eight shades of gray. The browser includes a usable text-only mode, but it too is slow for downloading Web pages.

There are other caveats. The Communicator weighs nearly a pound and stands 7 inches high—bulkier than the AT&T and Mitsubishi phones and stretching the bounds of what can be considered a pocket device. Also, it requires a cellular service called Global System for Mobile Communications that is not generally available in the United States and isn't expected to be as widespread as CDPD. Though Nokia has not yet set local pricing, in Great Britain the Communicator sells for the equivalent of a whopping $1800.

CALLING CUSTOMERS

DESPITE THESE products' appeal, we can't currently recommend them for the casual user. If you need wireless access to corporate data and e-mail and are willing to pay for it, however, the devices merit a look. Just make sure that cell service for the phone you're considering is available in your area and where you travel regularly. By year-end, expect lower prices and increasingly widespread service.

—Bryan Hastings

AT&T PocketNet, Mitsubishi MobileAccess

PRO: Best wireless data coverage.
CON: No fax client, tiny keypads.
VALUE: Good for basic e-mail.
Availability: First quarter 1997
Street price: $500 to $600
AT&T Wireless Services, 888/299-8558, http://www.airdata.com
READER SERVICE NO. 798
Mitsubishi Wireless Communications, 408/730-5900, http://www.mitsubishi.com/groups/pmc.htm
READER SERVICE NO. 799

Nokia 9000 Communicator

PRO: Best e-mail interface, fax.
CON: Costly, limited service area.
VALUE: Cell phone and PDA in one.
Availability: Summer 1997
Pricing: Unavailable at press time
Nokia Mobile Phones, 800/341-4667, http://www.nokia-americas.com
READER SERVICE NO. 800

Paging the World Wide Web

MOTOROLA'S PAGEWRITER offers Web access and e-mail.

CELLULAR PHONES are not the only portable communication gadgets jumping onto the Internet and donning palmtop personas. This June Motorola plans to offer the first keyboard-equipped pager that accesses e-mail and Web-based services. Based on the Motorola 68000 series CPU, the PageWriter has a 46-key QWERTY keyboard, a built-in pointing device, and a backlit LCD screen. It includes 1.25MB of RAM.

The PageWriter lets you send and receive e-mail and paging messages but not faxes. In addition, the PageWriter lets you access Web information made available by your paging service provider. The unit we tested had access to national weather, stock quotes, and flight information. The PageWriter does not include a browser for general Web surfing, nor does it support e-mail attachments.

This device is not designed for composing long messages. The keyboard is absurdly small, making data entry even more of a challenge than with conventional palmtops. But this pager's message-handling prowess rivals that of the cell phones discussed above. The PageWriter has a directory where you can store e-mail, pager, and fax addresses. You can also create mail groups that mix all three. And the device lets you forward messages to e-mail or pager addresses. The PageWriter will cost between $150 and $250. ▶

Motorola PageWriter

PRO: Very small, long battery life.
CON: Tiny keyboard, limited Internet access.
VALUE: Good for two-way paging and reading e-mail.
Availability: June 1997
Street price: $150 to $250
Motorola, 800/548-9954, http://www.mot.com/PageWriter
READER SERVICE NO. 801

Are You a Prudent Person?

Then invest in DTK networking solutions with Pentium® Pro processors!

PENTIUM® PRO PROCESSOR

Here's what *Computer Reseller News*, the industry's bible, said about DTK's network workstation:

"The APRI's all-SCSI peripherals, AMI BIOS, Intel 440FX chipset and proprietary motherboard combined to garner the highest overall score and to outpace the field in two of the five applications tests. It finished...a close second in the remaining three individual tests. "The DTK APRI-31M/P200 is a price/performance leader, and an excellent value..." — *CRN*, 9/2/96

"H-P, DTK lead the Pentium® Pro pack" — *CRN*, 9/2/96

When you *invest* in DTK networking workstations *dependability* and *performance* are your DTK *dividends!* Just look at the powerful controllers we've packed into your DTKAPRI-31 desktop networking station.

It's powered by a 200MHz Intel® Pentium® Pro processor. The 3COM network card ties right in to your company intranet. The fast, all-SCSI peripherals are controlled by an Adaptec® 2940 SCSI controller, the industry standard.

A 64-bit PCI graphics card with 4MB RAM makes for super-fast screen redraws, saving you time with every mouse click!

And your APRI-31 is neatly packaged in an easy-entry mid-tower case that needs no tools to open. This means real time-savings during upgrading or maintenance.

And DTK's APRI-31 desktop network stations ship with Windows NT™ Workstation ver. 4.0 already installed and tested on your hard drive!

APRI-31

- Intel 200MHz or 180MHz Pentium® Pro processor w/256KB L2 cache
- Up to 384MB EDO RAM on board
- 3COM Network Card
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- 2.5 Gigabyte EIDE Hard Drive
- 3.5-inch Floppy Disk Drive
- MS Mouse and MS Keyboard
- MS Windows NT Workstation v. 4.0
- 2-yr. Ltd. Warranty (On-Site opt'l.)

Now, DTK's new APRI-32 has *DUAL* Pentium® Pro processors!

The ultimate system for workstations and servers, it's DTK's new APRI-32, featuring dual Intel® Pentium® Pro 200MHz processors and an integrated Wide SCSI controller! The power of the new Windows® NT Workstation ver. 4.0 (shipped with the APRI-32) and DTK's new dual processor system make an ideal networking combination.

Now shipping, your new APRI-32 can be custom-configured with up to 384MB of EDO DRAM and a 3D or 2D PCI graphics card.

And, with the Seagate Wide SCSI hard drive with 2, 4 or 9 gigabyte capacity (2GB is standard), the APRI-32 is an unbeatable workstation/server system.

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DTK has combined the most advanced technology with sensible pricing. It doesn't take a Wall Street analyst to recognize the APRI-32 as a wise choice.

APRI-32

- **DUAL** Intel 200MHz Pentium® Pro processors w/256KB L2 cache
- Up to 384MB EDO RAM on board
- 3COM Network Card
- AMI Flash BIOS
- 6X SCSI CD-ROM drive
- PCI 64-bit Graphics Accelerator with 2MB or 4MB RAM
- 2,4, or 9GB SCSI-2 or Wide SCSI HD
- 3.5-inch Floppy Disk Drive
- MS Mouse and MS Keyboard
- MS Windows NT Workstation v. 4.0
- 2-Yr. Ltd. Warranty (On-Site opt'l.)

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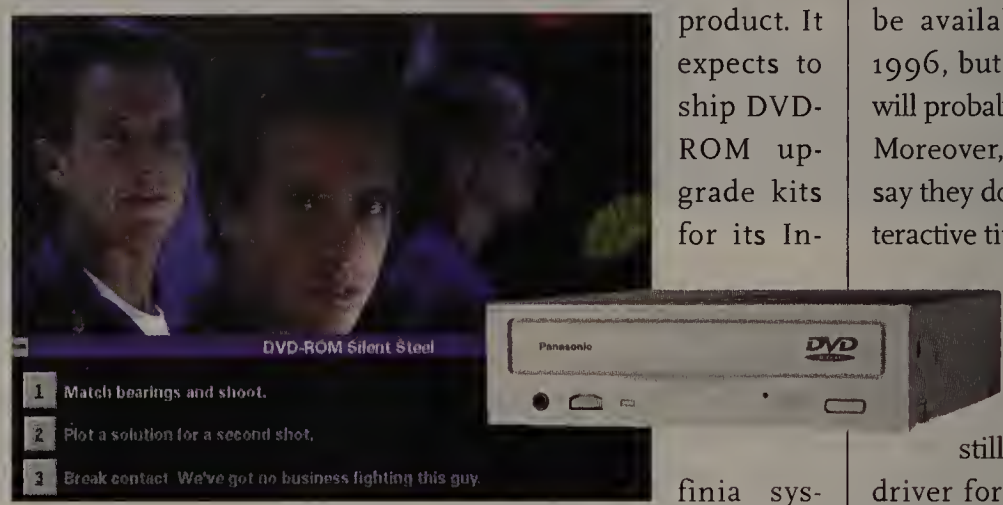
Circle 84 on reader service card

DVD Drives: Definitely Very Delayed

UPDATE

DIGITAL VIDEO DISC technology has won a spot in the vaporware hall of fame: After a year of hype, the technology still hasn't arrived. The latest word is that the DVD players won't hit stores until January 1997. These $500-to-$700 devices attach to a TV or PC and play 4.7GB discs that support high-quality audio and video. The first DVD-ROM drives, to be sold in PC upgrade kits and new home computers, will surface in February and March. But even with this good news, problems will remain: In March you'll find few movies or interactive titles for these devices.

At press time entertainment and computer executives had agreed on a DVD encryption scheme. Toshiba and Matsushita Consumer Electronics Company (the parent firm of Panasonic) will be first to market with DVD players. But neither company will provide a ship date. "We're waiting... to hear from the software community," says Rusty Osterstock, MCEC's national marketing manager. Sony, Pioneer, and Samsung plan to offer DVD players later in 1997.



SILENT STEEL, a video-intensive game, is among the first multimedia titles expected for the DVD format.

Toshiba will likely be the first company to unveil a PC product. It expects to ship DVD-ROM upgrade kits for its Infinia systems in February or March and will offer Infinias with DVD-ROM drives at the same time. Panasonic will sell consumer upgrade kits and drives for PCs starting in early 1997.

But what about software? Today you can buy one DVD-ROM, Digital Directory Assistance's $99 PhoneDisc PowerFinder USA One; the single disc packs six CD-ROMs' worth of listings. In early 1996 Warner Home Video, Hollywood's head DVD cheerleader, said 250 movies would be available by Christmas 1996, but the actual number will probably be fewer than 50. Moreover, CD-ROM vendors say they don't expect many interactive titles before fall 1997.

One final issue could delay hardware and software: Microsoft is still developing a device driver for Windows 95, and software that lets the DVD-ROM drive recognize the DVD-ROM file format. The latter software isn't done, says Bill Veghte, Microsoft's Windows Platform group manager. "We have no comment on time frame at this point," he says. Time will tell.

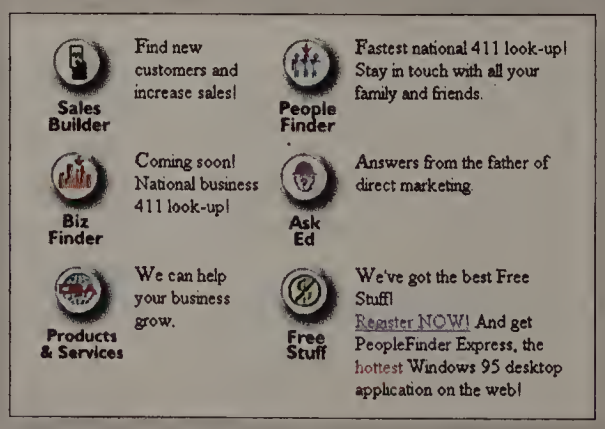
—Laurianne McLaughlin

WEB BROWSER

Sales Builder Offers Web-Based Direct Marketing

ANY MARKETING manager knows how long it takes to build and maintain an accurate database of sales leads and direct marketing information. Now you can automate the process using Database America Companies' online lead-generating product, **Sales Builder**.

By logging on to the World Wide Web site of Sales Builder from Database America (http://www.databaseamerica.com), small and medium-size businesses can access detailed information from Database America's file of more than 11 million U.S. businesses and use this information to create targeted prospect lists. Users can select marketing criteria such as demographic and geographic attributes and hone the list to specify details like sales volume and number of employees. Be warned, these searches can take time—on our T1 line we often waited 5 to 10 minutes to get results.



DATABASE BUILDER: You can create a direct marketing campaign with Sales Builder.

Sales Builder generates a list of sales leads, which users can download to their computers for a nickel per lead. The list includes business names, addresses, and phone numbers that you can export to any desktop word processing or spreadsheet application. You can also purchase the data for shipment in hard copy labels.

Database America is rolling out two versions of Sales Builder. A small office/home office version will enable users to search by business type, geographic delimiter, unit sales, and staffing levels. An industrial version targets the more traditional business marketing manager, with in-depth features such as credit reports and detailed information on sales volume.

Users of Sales Builder need register for the service only when they are ready to purchase a lead. Database America's file of businesses is updated quarterly.

—Samantha Parent ■

THE VISIONMASTER PRO 21

LOOKING GOOD AT JUST $1,620 ESP

THE VISIONMASTER PRO 21

GUESS WHAT THE BRITISH, FRENCH, AND JAPANESE KNOW ABOUT GRAPHICS AND IMAGING THAT YOU DON'T ?

THE U.K'S BEST-SELLER.
They know performance when they see - and use - it.

PICTURE PERFECT IN FRANCE.
The choice of one of France's largest multimedia production companies (that's nothing to sniff at).

ONE OF JAPAN'S TOP THREE.
iiyama is consistently among the top three in monitor sales for all of Japan.

A WORLDWIDE FAVORITE.
Engineers at one of Japan's largest computer products companies look at the big picture on iiyama monitors.

They Look Much Better On An iiyama Pro 21"

A FULL LINE AT GREAT PRICES

Model/ Viewable Area	Dot Pitch Horiz. Scan	Max. Horiz. Scan Rate	Refresh Rate	ESP
21" MT-9021E (19.5" vis)	.30mm Aperture Grille	94 kHz	76 Hz (1600 x 1200)	$1,620
21" MF-8221E (19.5" vis)	.27mm Flat Square	94 kHz	76 Hz (1600 x 1200)	$1,585
17" MT-9017E (16" vis)	.25mm Aperture Grille	92 kHz	72 Hz (1600 x 1200)	$799
17" MF-8617E (15.75" vis)	.26mm Flat Square	86 kHz	69 Hz (1600 x 1200)	$710
15" MF-8515F (13.9" vis)	.28mm Flat Square	66 kHz	80 Hz (1024 x 768)	$374

No matter where you go in the world, there's a universal word for dazzling clarity, blazing color, and precision performance: *iiyama* – makers of international best-selling monitors for graphics, imaging and desktop publishing.

Whether you choose our spectacular VisionMaster Pro 21 with its Diamondtron® CRT technology, or any of our other popular 15" and 17" models, count on unequaled clarity, high refresh rates, on-screen precision controls, and countless other high-end features normally found on much more expensive monitors.

Discover the superior features, service and 3-year warranty that helped put *iiyama* monitors on the map – in North America and around the world. Stop by our Web site or call today for more information and the name of the authorized dealer nearest you.

Windows SOFTWARE PICK · ResellerNews · PC MAGAZINE EDITORS' CHOICE · PC WORLD BEST BUY July, 1996 · colorific

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www.iiyama.com

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Circle 108 on reader service card

It's Not
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24-Hour Gig!
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"You've got a friend in the business."®

We've Gotten Bigger This Year!

Like Santa, we're burstin' at the seams ... with pride. The Destination™ Big Screen PC is the star on the GATEWAY™ product tree! And now it's more affordable than ever, with prices starting as low as $2,999.

Gather the whole gang. Powerful PC technology, digital television capabilities and everything you need to sled the Web are yours to enjoy for the holidays and the new year! Best of all, you can experience everything from the comfort of your couch. Your living room will become a hub for education, communication and entertainment. Call us today for more details on the Destination system and a digital satellite system offer* from DISH™ Network. It's such a great deal, this holiday season you won't even have to tighten your belt!

HOLIDAY BONUS! Free* DISH Network Digital Satellite System Offer. Call for details!

*For a limited time, Destination system purchases include a coupon for one DISH Network Satellite system (satellite receiver, 18-inch antenna with single LNBF, infrared remote control) at no charge with the purchase of a one-year subscription to a qualifying programming package from DISH Network for $300. Taxes, delivery and installation not included. Satellite system service covers 48 contiguous states and is supported by DISH Network. Residential use only.

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"You've got a friend in the business."®

800-424-1462
www.gw2k.com

Top-Of-The-Line Technology!

Hats off to Santa for delivering the latest and greatest technology and outstanding values from Gateway 2000.

If you're looking for PC performance that will blow you away, you need Intel's next-generation Pentium® Pro processor — the smart choice for today's *and* tomorrow's 32-bit software. Microsoft® Office 95, Professional Edition* applications will fly like Santa at sunrise when powered by a Pentium Pro processor.

Need a Pentium processor-based PC? Look no further. Our professional Pentium processor-based systems are packed with features and they're priced right. Tell us your needs. We'll build a PC to your specifications and pre-install the software. You've been good this year, so treat yourself. Call Gateway today!

*For a limited time (with qualifying purchase) receive a coupon for a free MS Office 97, Professional Edition upgrade on CD after release from Microsoft.

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All The Bells And Whistles!

It's all here! Gateway is your one-stop shop for fully-loaded Family PC™ systems, XL multimedia computers and quality software.

The performance of an Intel Pentium® Pro processor, MS® Windows® 95 and Generations III has moved home for the holidays — and for years to come! Because we custom build each PC, you get a system that meets your needs *and* fits your budget. You choose from cool technology like Gateway exclusive Altec™ Lansing speakers, fast CD-ROM drives, CD-recordable drives, and hardware accelerated 3-D video for smooth gaming and animation graphics. Vivid images shine through on our CrystalScan®700 (15.9 viewable) monitors with advanced Microfilter™ picture tube technology.

It's a present the whole family will love! Plus, you can take advantage of a digital satellite system offer* from DISH™ Network. Ring in the new year with unmatched 32-bit performance and value. Add up software savings too. We offer additional specialized software bundles for every stocking! The Gateway Select program makes it easy by setting software standards for quality, value and ease of use.

Generations III

- MS® Encarta® 96
- MS Works 95
- MS Publisher 97
- Monopoly™
- Green Eggs and Ham
- Myst®
- MS Greetings Workshop
- MS Money 97
- Mayo Clinic® Family Health 3.0
- TripMaker™ 97
- Launch® Issue 9
- Ca$h Graf Home Office Plus™ 2.22

HOLIDAY BONUS! Free* DISH Network Digital Satellite System Offer. Call for details!

*For a limited time, Destination system purchases include a coupon for one DISH Network Satellite system (satellite receiver, 18-inch antenna with single LNBF, infrared remote control) at no charge with the purchase of a one-year subscription to a qualifying programming package from DISH Network for $300. Taxes, delivery and installation not included. Satellite system service covers 48 contiguous states and is supported by DISH Network. Residential use only.

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Holiday Goodies To Go!

Whether you're off on a delivery or headed home for the night, Gateway Solo™ 2100 multimedia portables really haul! Hand-pick the portable options you need. A powerful Intel Pentium® processor and Microsoft® Windows® 95 will get you off to a great start. Then choose the size of your screen, hard drive, memory, processor speed and either MS® Office 95 Professional Edition* or MS Works 95. Continue customizing your computer with the flexibility of modular components. It's easy to swap a CD-ROM drive for a floppy drive, and since they aren't built in you have less weight to carry around. Plus, a removable hard drive makes it a snap to secure data. Steer clear of companies that leave you without options. Wherever you need to be, Gateway Solo 2100 portables deliver power-packed performance at a great value!

*For a limited time (with qualifying purchase) receive a coupon for a free MS Office 97, Professional Edition upgrade on CD after release from Microsoft.

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We're Delivering Magic This Year!
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Gateway makes holiday shopping *seem* like magic. Along with high-performance, quality PCs, we bring you good tidings of a new financing option, available exclusively to Gateway customers — past and present.

Gateway Easy Pay Plan

- No payments for 90 days
- Fixed monthly payments
- Borrow $1,000 to $25,000
- Quick credit approval

Gateway accepts most major credit cards and C.O.D. terms. Qualified commercial customers can choose from net 30-day credit terms or leasing options as well. We'll go out of our way to light up your holidays. In fact, if you aren't totally satisfied, you can return your PC within 30 days of the original delivery date for a refund of the purchase price (shipping charges to and from the customer are not refundable). Plus, we have a great limited warranty — just call or write for details. Gateway knows how to deliver satisfaction. In the October *FamilyPC* magazine, 94% of the Gateway customers surveyed said they'd recommend their Gateway system to a friend. Give us a jingle. We'll make *your* holidays merry!

The Gateway Easy Pay Plan is issued and administered by MBNA America® Bank, N.A.

GATEWAY2000

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Holiday Upgrades!

Wrap up your holidays here! The finishing touches you need to complete and complement your computer are available with the purchase of any GATEWAY 2000® PC. We'll pre-install these upgrades for you and deliver your system right to your doorstep — just like Santa.

Altec Lansing ACS-410 Speaker System with Subwoofer

Desktop Upgrades

- **Altec™ Lansing ACS-251 Subwoofer $75**
- **Altec Lansing ACS-410 Speaker System w/ ACS-251 Subwoofer $120**
  (upgrade from PCs that include Altec ACS-41 speakers)
- **12X CD-ROM Drive $50**
  (upgrade from PCs that include 8X CD-ROM drives)
- **CD-Recordable Drive $499**
  4X read/2X write recordable CD drive with SCSI controller, CD Creator 2 for MS® Windows® and three media disks.
- **Iomega® Ditto™ 3200 Internal Tape Backup Unit $199**
  3200MB with compression, nominal 1600MB
- **Iomega External Zip™ 100MB Drive $199**
  (less $50 manufacturer rebate)
- **Iomega Jaz™ 1GB Drive $429**
  (includes SCSI controller and 1GB cartridge)
- **MS Windows NT® 4.0 Upgrade $99**
  (upgrade from PCs that include MS Windows 95)

Gateway Solo 2100 Mini Docking Bar

Portable PC Upgrades

- Gateway Solo™ 2100 Mini Docking Bar **$199**
- 28.8 PCMCIA Fax/Modem **$200**
- Upgrade 120MHz to 133MHz Intel® Pentium® Processor **$150**
- Upgrade 133MHz to 150MHz Intel Pentium Processor **$150**
- Upgrade from an 11.3" Dual Scan to an 11.3" Active Matrix SVGA color display **$380**
- Upgrade from an 11.3" Active Matrix to a 12.1" Active Matrix SVGA color display **$150**

harman/kardon High-Fidelity Sound System

Destination™ Big Screen PC Upgrades

- **harman/kardon High-Fidelity Sound System**
  Seven-piece Dolby® Pro Logic® Surround Sound speaker system including AVR-10 audio/video receiver with remote, subwoofer, center channel, and four satellites for the ultimate multimedia audio experience. **$699**

Stocking Stuffers!

Visions of peripherals dancing in your head? You've ome to the right spot! But remember, these offers are vailable only for GATEWAY™ PC owners — both old and ew. If you'd like to see our complete line of stocking tuffers, call component add-on sales at 800-846-2080. Sales Hours: 7am-10pm Weekdays (CT).

GATEWAY SELECT

Gateway software bundles will make your holidays merry. We've taken the work out of shopping for software. Our new Gateway Select program ensures that you're getting software that meets or exceeds our standards for quality, value and ease of use. There's something for everyone! At these prices, why not buy two?

Software

- **Games & Entertainment Pack**
  Includes Su-27 FLANKER™; Al Unser Jr. Arcade Racing™; 3-D Ultra Pinball™; The Journeyman Project 2®: Buried in Time™; Greg Norman Ultimate Challenge® Golf; Windows 95 Game Sampler and game pad. **$99**
- **Kid's BackPack™ III**
  ncludes Schoolhouse Rock!™: Grammar Rock™; Sesame Street: Get Set o Learn®; Math Blaster® Episode 2: Secret of the Lost City; Imo & The King™; Putt-Putt® Goes To The Moon™; and Gateway cow-spotted ackpack. **$59**
- **Finance Pack** *(U.S. Shipment Only)*
  ncludes Quicken® Deluxe 5, Quicken Financial Planner,™ Quicken Family Lawyer,™ and Quicken Parents' Guide to Money.™ **$69**

Great Extras

- MS SideWinder™ 3D Pro Joystick **$59**
- SKYMASTER Joystick **$39**
- Snappy™ Video Snapshot **$199**
- Epson PhotoPC™ Color Digital Camera **$399**
- Microsoft Natural® Keyboard **$59**

Printers

Put the finishing touch on your computing package with one of these quality printers. Ask your sales representative which one is right for you. All printers include cables and ink cartridges.

- Epson® Stylus™ Color 200 Ink Jet Printer **$179**
- Canon® BJC®-240 Bubble Jet™ Printer **$189**
- Epson Stylus Color 500 Ink Jet Printer **$279**
- Canon BJC-70 Portable Bubble Jet Printer **$299**
- Hewlett®-Packard 682C Ink Jet Printer **$299**
- Epson Stylus Pro Ink Jet Printer **$379**
- Hewlett-Packard LaserJet 5L Xtra Laser Printer **$479**
  (less $50 manufacturer rebate)
- Hewlett-Packard LaserJet 6P Laser Printer **$799**

Service & Support

Gateway Gold™ Premium for Desktop Systems

- Extended Three-Year On-Site Agreement*
- Priority 800 Number For Access to Technical Experts
  With system purchase **$99**
  Within term of current on-site service agreement **$129**

**On-site service is available to most locations in the continental United States, Alaska, Hawaii, Puerto Rico and Canada after you and your Gateway technician determine an on-site visit is necessary. On-site service is provided by PC Technology Services, Inc. On-site is not available for any monitor, mouse, keyboard, or portable system. Write or call for a free copy of the on-site service agreement.*

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P5-133 FAMILY PC

- Intel® 133MHz Pentium® Processor
- 16MB Synchronous DRAM
- CrystalScan®500 .28dp Monitor (13.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 1.2GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit GATEWAY™ Sound
- Altec™ Lansing ACS-41 Speakers
- TelePath® 33.6 Data*/14.4 Fax Modem *for Windows* with Speakerphone
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS® Mouse 2.0
- Microsoft® Windows® 95
- Generations III Software Collection
- Gateway Gold™ Service & Support for Desktop PCs
- DISH™ Network Satellite System Offer**

$1699 As low as✗ $48/mo.

P5-166 FAMILY PC

- Intel 166MHz Pentium Processor
- 16MB Synchronous DRAM
- 256K Pipelined Burst Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Gateway Sound
- Altec Lansing ACS-41 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem *for Windows* with Speakerphone
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations III Software Collection
- Gateway Gold Service & Support for Desktop PCs
- DISH Network Satellite System Offer**

$2199 As low as✗ $62/mo.

P5-200 FAMILY PC

- Intel 200MHz Pentium Processor
- 32MB Synchronous DRAM
- 256K Pipelined Burst Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq® Wavetable Sound Card
- Altec Lansing ACS-41 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem *for Windows* with Speakerphone
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations III Software Collection
- Gateway Gold Service & Support for Desktop PCs
- DISH Network Satellite System Offer**

$2499 As low as✗ $70/mo.

G6-180 FAMILY PC

- Intel 180MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq Wavetable Sound Card
- Altec Lansing ACS-41 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem with Speakerphone
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations III Software Collection
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- DISH Network Satellite System Offer**

$2499 As low as✗ $70/mo.

G6-200 FAMILY PC

- Intel 200MHz Pentium Pro Processor
- 64MB EDO DRAM
- 256K Internal Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- STB® ViRGE™/VX 4MB, 3-D 64-Bit PCI Graphics
- 3.8GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq Wavetable Sound Card
- Altec Lansing ACS-41 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem with Speakerphone
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations III Software Collection
- Gateway Gold Service & Support for Desktop PCs
- DISH Network Satellite System Offer**

$2999 As low as✗ $84/mo.

G6-200XL

- Intel 200MHz Pentium Pro Processor
- 64MB EDO DRAM
- 256K Internal Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- STB ViRGE/VX 8MB, 3-D 64-Bit PCI Grap
- 3.8GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- ▸ **CD-Recordable w/ SCSI Controller**
- 16-Bit Ensoniq Wavetable Sound Card
- Altec ACS-410 & ACS-251 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem with Speakerphone
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon◆
- Generations III Software Collection
- Gateway Gold Premium Service & Support for Desktop PCs
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$3799 As low as✗ $106/mo.

P5-133

- Intel 133MHz Pentium Processor
- 16MB Synchronous DRAM
- 256K Pipelined Burst Cache
- CrystalScan500 .28dp Monitor (13.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon◆
- Gateway Gold Service & Support for Desktop PCs

$1699 Business Lease† $63/mo.

G6-200

- Intel 200MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Vivitron700 .26dp Monitor (15.9" viewable area)
- STB ViRGE/VX 4MB, 3-D 64-Bit PCI Graphics
- 3.8GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon◆
- Gateway Gold Service & Support for Desktop PCs

$2699 Business Lease† $99/mo.

P5-166

- Intel 166MHz Pentium Processor
- 32MB Synchronous DRAM
- 256K Pipelined Burst Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon◆
- Gateway Gold Service & Support for Desktop PCs

$2299 Business Lease† $85/mo.

**Maximum data transfer rate dependent on certain variables including particular modems with which you are communicating, telephone lines, communications software and communications protocols.*

◆For a limited time (with qualifying purchase) receive a coupon for a free MS Office 97, Professional Edition upgrade on CD after release from Microsoft. Call for details!

Gateway 2000 Quality Manufacturing Systems for Customer Hardware Support, Sioux Falls, South Dakota; Desktop & Portable Manufacturing Divisions and Remanufacturing in North Sioux City, South Dakota, are ISO 9002 certified.

G6-180

- Intel 180MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Vivitron®700 .26dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 3.8GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon◆
- Gateway Gold Service & Support for Desktop PCs

$2499 Business Lease† $92/mo.

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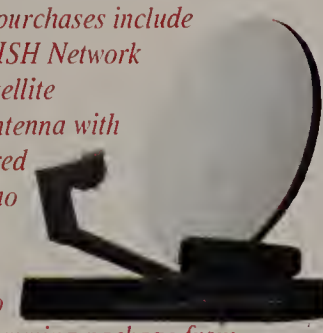

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Component Add-On Sales 800-846-2080 • Sales Hours: 7am-10pm Weekdays, 9am-5pm Saturdays & Sundays (CT)

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Destination™ Big Screen PCs

D5-133

- Intel® 133MHz Pentium® Processor
- 32MB Synchronous DRAM
- 256K Pipelined Burst Cache
- Destination 31" VGA Monitor
- STB® 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq® Wavetable Sound Card
- TelePath® 33.6 Data*/14.4 Fax Modem
- 7-Bay Charcoal-Colored PC Case
- Wireless Keyboard w/ Integrated EZ Pad™ Pointing Device
- Wireless Field Mouse® Remote
- Four-Channel RF Receiver
- Microsoft® Windows® 95
- Destination Software Collection
- Gateway Gold™ Service and Support✚ for Big Screen PCs
- DISH™ Network Satellite System Offer**

$2999 As low as× $84/mo.

D6-180

- Intel 180MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Destination 31" VGA Monitor
- STB 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- 2.5GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq Wavetable Sound Card
- ▸ **harman/kardon High-Fidelity Sound System**
- TelePath 33.6 Data*/14.4 Fax Modem
- 7-Bay Charcoal-Colored PC Case
- Wireless Keyboard w/ Integrated EZ Pad Pointing Device
- Wireless Field Mouse Remote
- Four-Channel RF Receiver
- MS® Windows 95
- Destination Software Collection
- Gateway Gold Service and Support✚ for Big Screen PCs
- DISH Network Satellite System Offer**

$3999 As low as× $112/mo.

D6-200

- Intel 200MHz Pentium Pro Processor
- 64MB EDO DRAM
- 256K Internal Cache
- Destination 31" VGA Monitor
- STB 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- 3.8GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq Wavetable Sound Card
- ▸ **harman/kardon High-Fidelity Sound Syst**
- TelePath 33.6 Data*/14.4 Fax Modem
- 7-Bay Charcoal-Colored PC Case
- Wireless Keyboard w/ Integrated EZ Pad Pointing Device
- Wireless Field Mouse Remote
- Four-Channel RF Receiver
- MS Windows 95
- Destination Software Collection
- Gateway Gold Premium Service and Support✚ for Big Screen PCs
- DISH Network Satellite System Offer**

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Gateway Solo™ 2100 Portable PCs

S5-120

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- 1MB EDO Video RAM
- Zoomed Video Port
- 810MB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- NiMH Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Works 95
- Gateway Gold Service and Support for Portable PCs

$2499 As low as× $70/mo.

S5-133

- 11.3" Active Matrix SVGA Color Display
- Intel 133MHz Pentium Processor
- 24MB EDO DRAM expandable to 40MB
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
- 1.3GB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Office 95, Professional Edition◆
- Gateway Gold Service and Support for Portable PCs

$3549 As low as× $99/mo.

S5-133 Best Buy

- 12.1" Active Matrix SVGA Color Display
- Intel 133MHz Pentium Processor
- 40MB EDO DRAM
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
- 1.3GB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- 28.8 PCMCIA Fax/Modem
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Office 95, Professional Edition◆
- Gateway Gold Service and Support for Portable PCs

$4149 As low as× $116/mo.

intel inside
PENTIUM PRO PROCESSOR

***DISH Network Satellite system offer and ◆MS Office 97, Professional Edition upgrade coupon details on previous page.*
✚The Destination 31" monitor is covered by a one-year limited warranty.

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NEW PRODUCTS

IBM's Vision of Home Fashion: Aptiva S Series PCs

IBM'S APTIVA S series has fancy designs and fancy prices.

DESKTOP

IN THE PC MARKET, home is where the heart of design innovation may be. Consider the sleek new designs from Compaq, Sony, and Toshiba, which added consumer electronics features to fast Pentium PCs. Now IBM's new **Aptiva S** series delivers systems with unique space-saving designs and strong software bundles including Lotus SmartSuite, telephony applications, and games.

You won't mistake the Aptiva S for a home PC of old. The monitor sits above the desktop on a tubular base, and it sports a microphone and a pair of speakers on either side of the display. The real innovation, however, is the slim media console situated beneath the monitor and connected to the minitower via a 6-foot cable. Push a button on top of the console, and the 8X CD-ROM drive and floppy drive emerge to allow easy, desk-level access. The result: no ugly system unit on your desk, no straining to reach an out-of-the-way CD-ROM drive, and no moving the keyboard to clear access to a floppy drive.

When you aren't using the system, the Aptiva keyboard tucks beneath the monitor, resting on top of the closed media console. A cordless mouse helps to eliminate unsightly wires. The mouse uses radio signals, which lets it work even when other objects are blocking the visual path between it and the PC.

A ROSE BY ANY OTHER NAME

FOR ALL ITS design tweaks, though, the Aptiva S consists of the familiar PC components: A standard minitower—in black—contains the CPU, memory, hard disk, and add-in slots and bays. The $3148 Aptiva S66 that I tested packs 16MB of RAM, a 256K secondary cache, a 3.2GB hard drive, and a 15-inch monitor. An ATI 3D Rage graphics chip provides 2-D and 3-D Windows graphics acceleration, while a 33.6-kbps voice-capable modem supports quick Internet access. The system also features a joystick for game play. In the PC WorldBench test suite, the Aptiva S displayed average performance for a Pentium-166 PC of its general configuration.

Clearly IBM has done its homework, but the Aptiva S does have several drawbacks. Most noticeably, the media console cannot accept additional drives. An internal CD-Recorder or tape drive must be installed in the minitower. Also, though the cordless radio mouse is a nice touch, the keyboard remains tethered to the minitower. And the mouse, keyboard, and joystick all use separate ports, despite the presence of a Universal Serial Bus port on the back of the minitower.

The street price of $3148 with monitor is not low: IBM figures it can get a premium for this Aptiva, as does Sony with its similarly priced Sony PCV-70 home system. Toshiba's similar Inifinia 710 costs $700 less. Still, IBM's three-year warranty and its strong reliability and service scores in *PC World*'s monthly fax-back surveys add value.

—*Michael Desmond*

IBM Aptiva S66

PRO: Excellent design, handy console with CD-ROM and floppy drives.

CON: Average performance; can't add to console unit.

VALUE: You pay quite a premium for this design.

IBM
800/426-7235
http://www.pc.ibm.com/aptiva
Street price: $3148 with monitor

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94 ProZip file-compression tool
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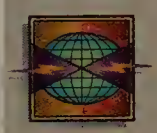
96 Business Maestro analysis software
96 Big Business 2.0 suite
100 Bryce 2, Detailer 1.0 3-D graphics programs
100 CorelDraw 7
102 Compass 3B00
102 PointCast Network 1.1
104 Internet Music Kit, Roland Virtual SoundCanvas Music Pack, Sound Bar audio programs
104 HTML Transit 2.0

INTERNET



FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at **http://www.pcworld.com/news.html.**

Meet the Mopier—HP Laser That Collates, Staples, and Sorts

PRINTER

THE OFFICE COPIER isn't the hot gossip spot it used to be—many people have found they can make multiple copies of a document faster on the network laser printer. Printer companies call this *mopying*, "multiple original printing." Now HP has introduced the **LaserJet 5Si Mopier,** a first-of-breed printer that allows multiple original printing without clogging the local area network. This 24-ppm laser with 600-dpi resolution also performs jobs other network lasers can't: It collates, staples, and sorts print jobs into a five-bin mailbox. (Some printers accept add-on mailboxes, but most are expensive and bulky.) The Mopier is street-priced at about $8900, a big jump from HP's $4599 LaserJet 5SiMx.

For large offices that generate a high volume of multiple-page documents, the HP LaserJet 5Si Mopier offers substantial benefits. We did not receive a shipping unit in time to test, so we can't comment on speed. But otherwise, the convenience of the unit is obvious: With two 500-sheet trays, a 100-sheet multipurpose tray, and a 2000-sheet input tray, the Mopier holds up to 3100 sheets of paper and has a duplexing unit for two-sided printing. And you can use duplex printing with the included HP software to make booklets.

Mopying print jobs don't clog your local area network, because of HP's new "transmit once" spooling technology, which keeps the network traffic low. The unit receives and stores information on a 420MB internal hard drive; then it outputs the appropriate number of prints. You can use the hard drive to store forms, as well. The Mopier comes with an HP JetDirect print-server card (for Ethernet and LocalTalk networks) and HP's JetAdmin software. The machine has 12MB of RAM, expandable to 76MB.

SMARTER LASER: HP'S LaserJet 5Si Mopier offers advanced document handling.

HP also offers owners of LaserJet 5SiMX printers a $1279 Mopy Upgrade Kit that adds the new capabilities to their existing units. (The kit includes software, a 420MB hard drive, and a few boards to be installed inside the printer.) To get the new paper-handling options, upgraders must pay for the 2000-sheet input tray ($1299); duplex unit ($669); multibin mailbox ($1889); and envelope feeder ($549).

The new LaserJet 5Si Mopier won't eliminate the need for a copier, but this printer should make it easier and faster to print many copies of a multipage document, such as a presentation. And industry analysts say that you'll save money if you use a printer more than a copier.

If you generate 6000 pages per month, Mopier pages cost 5.5 cents each, HP says, while copier pages cost 6.5 to 10.3 cents each. At 8000 pages per month, Mopier output runs about 4.7 cents per page, compared to 5.6 to 8.7 cents per page for an average copier's output. And at 10,000 pages per month, Mopier production costs 4.2 cents per page versus 5.1 to 7.7 cents for copier production. (HP estimates per-page costs by factoring in supplies and maintenance costs.) "It doesn't eliminate the copier cost, but it grabs some of the volume and should cost you less per page," says Keith Kmetz, an IDC research manager. Additional network lasers that come standard with collating, stapling, and sorting features should appear in early 1997, Kmetz says.

—*Laurianne McLaughlin*

HP LaserJet 5Si Mopier

PRO: Multiple print jobs won't clog your network; has innovative paper handling.

CON: Reduces copier usage, but doesn't eliminate need for one altogether.

VALUE: Solid choice from industry leader Hewlett-Packard.

Street price: $8900

Hewlett-Packard

800/752-0900

http://www.hp.com

READER SERVICE NO. 754

EDITED BY
Laurianne McLaughlin

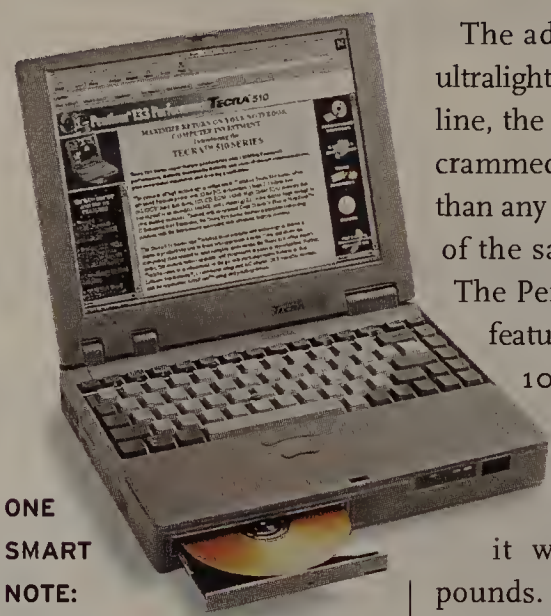
Toshiba Notebooks: Brawn and Bargain Prices

NOTEBOOK

TO BOLSTER ITS multimedia offerings, **Toshiba** has developed new models for each of its four notebook families. Each incorporates features conspicuously absent from previous Toshiba notebooks, plus cutting-edge technologies.

The lower-end Satellite 200CDS unit and the Satellite Pro 430 series (available in active and dual-scan screen versions) offer 16-bit sound and faster processors, and they support the new Zoomed Video PC Cards, which promise faster full-screen video. The 7.9-pound Satellite 200CDS includes a Pentium-100 CPU and 6X CD-ROM drive for $1999. Units were not available for performance testing at press time.

The Satellite Pro 430s will be the first notebooks on the market to feature a 10X CD-ROM drive. The Satellite Pro 430CDS has a Pentium-120 processor and an 11.3-inch dual-scan screen for $2499.



ONE SMART NOTE: Toshiba's Tecra line just got better.

Its active-matrix sibling, the Satellite Pro 430CDT will hit the street at around $3399. Both units weigh about 7.4 pounds. You'll be hard pressed to find better multimedia notebooks at these prices.

The addition to Toshiba's ultralight, ultrapacked Portégé line, the Portégé 660CDT, is crammed with more features than any competing notebook of the same size can boast. The Pentium-150 machine features Zoomed video, a 10X CD-ROM drive, and an 11.3-inch active-matrix screen—and in all, it weighs less than 5 pounds. But your wallet had better be heavy: This unit costs around $4999.

The $4999 Tecra 510CDT and $3699 Tecra 510CDS—Pentium-133 additions to Toshiba's high-end line—come with a 12.1-inch dual-scan or active-matrix screen, and a 10X CD-ROM drive. The 8.2-pound 510s also feature convenient built-in AC adapters, which preclude the dreaded brick-on-a-leash syndrome.

—Eric Hellweg

Toshiba Satellite 200CDS, Satellite Pro 430CDS and 430CDT, Portégé 660CDT, and Tecra 510CDS and 510CDT

PRO: More multimedia punch for roughly the same price as previous Toshiba models.

CON: Portégé models still expensive.

VALUE: Proven notebook leader offers impressive new choices.

Toshiba Computer Systems Division

800/334-3445

http://www.computers.toshiba.com

Street prices: $1999 to $4999

READER SERVICE NO. 755

QUICK TAKES

Bank Spotting

Even if you use travelers checks when you're on the road, there are times when you need some quick cash. Internationally, Visa charge cards and ATM debit cards that support the Plus network are accepted in cash machines in more than 102 countries. Here's a tip for finding these cash machines: Before you leave on your next trip, check out Visa's online listing of ATM locations (http://visa.infonow.net/powersearch.html). For U.S. locations, just enter an address or a zip code, and up pops a map of your query location with the three nearest ATMs. The map also provides addresses, institution names, and phone numbers.

IBM Improves ThinkPad 365 and 760 Lines

NOTEBOOK

IBM SUCCESSFULLY bundles more features for less money in its newest **ThinkPad 365 and 760** notebooks. In both lines, IBM added bigger hard drives, larger displays, and faster CD-ROM drives.

The affordable $2499 ThinkPad 365X has an 11.3-inch dual-scan screen, 1.08GB hard disk, and no CD-ROM drive. (Base configurations carry only 8MB of RAM, but you can upgrade to 16MB of memory for $115.) The $3499 6.2-pound ThinkPad 365XD, which we tested with 16MB of RAM, registered average performance on the PC WorldBench tests. But this 133-MHz Pentium notebook includes a 1.35GB hard drive, a 6X CD-ROM drive, and an impressive 11.3-inch active-matrix display. It's a cost-effective business notebook.

If you need more powerful performance, consider IBM's $5699 ThinkPad 760E and $5999 760ED models.

The 6.2-pound 760E and the 6.7-pound 760ED are equipped with P-150 and P-133 processors, respectively, and 16MB of RAM. Removable hard drives for both models range in size from 1.08GB to 2.1GB; and with the UltraBay (a free internal bay), you can add a second battery or hard drive. A 12.1-inch active matrix XGA screen comes standard. Frequent travelers who demand high performance—and can afford to pay for it—should consider the new 760 notebooks.

—Allyson Bates ▶

ThinkPad 365X and 365XD, ThinkPad 760E and 760ED

PRO: Affordable; large hard drives and displays

CON: 365 units yield only average performance.

VALUE: Spiffy budget and multimedia notebooks for reasonable prices.

IBM

800/772-2227

http://www.ibm.com

Street prices: $2499 to $5999

What Would You Call A Stereo You Can Fax On, A CD Player You Can Talk On And A High-Speed Modem You Can Watch Movies On, Except Cool?

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PremierSound Audio System for the ultimate sound in a multimedia notebook.

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Integrated 33.6Kbps data modem provides the fastest Internet access available over standard phone lines.*

Introducing The Compaq Presario 1000 Series.

What do you look for in a multimedia notebook? A powerful 133MHz Pentium® processor? Absolutely. High capacity hard drives? Sure. But really, when you boil it all down, don't you just want it to be able to work and play as hard as you do?

Introducing the Compaq Presario 1000 Series. It's pretty much everything you could ever want in one neat little multimedia package. High-speed CD-ROM. Fast modem*. A PremierSound Audio System with Easy Access Buttons that make it work just like your stereo. And a full duplex speakerphone.

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intel inside pentium® processor

COMPAQ

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Circle 47 on reader service card

Adobe Persuasion 4.0: A Favorite Falls Behind

PRESENTATION

ADOBE'S PERSUASION is a venerable product that hasn't had a major upgrade in a long time. Now that it has arrived, how does **Persuasion 4.0** stack up against Microsoft PowerPoint, Lotus Freelance Graphics, and Astound's Astound? My testing of a prerelease version yielded mixed results. Clearly, the first two products are better for beginners.

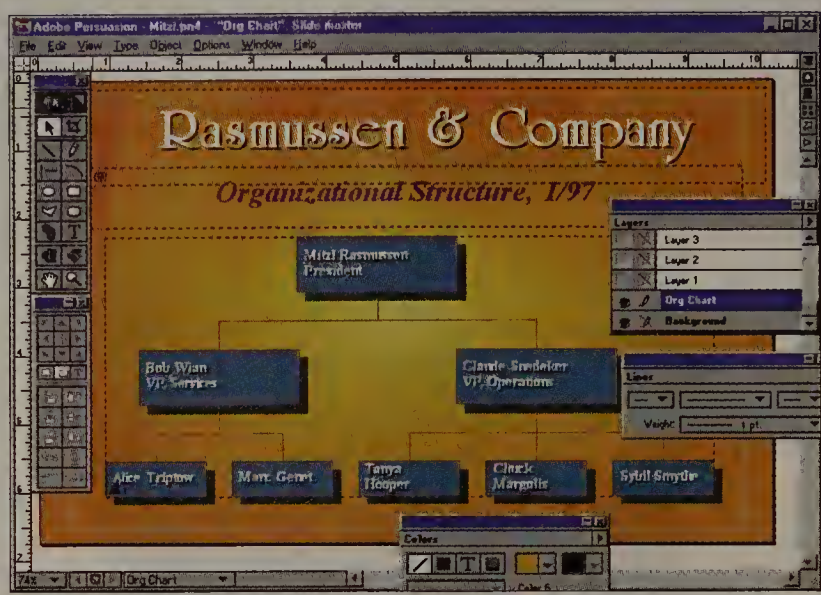
The Persuasion interface is now more like Adobe Photoshop's, with similar menus and floating tool palettes. It comes on a CD-ROM with nearly identical versions for Windows (3.1 and 95) and Macintosh that create compatible cross-platform files.

Persuasion 4.0 provides the basic presentation tools you'd expect, including nice charting and table features, plus adequate options for adding multimedia and interactivity. But it lacks wizard-style automated help—a crucial feature for beginners.

At the upper end of the market, Persuasion doesn't rival the sheer power of Astound. Persuasion's drawing tools are rudimentary, and its supply of transition and animation effects is stingy.

Persuasion lets you post presentations on the World Wide Web, but it turns them into Adobe Acrobat PDF files. It would be nice if Persuasion could format in HTML also.

—*Harry McCracken*



MORE SHOW THAN TELL: Adobe's Persuasion 4.0 has basic presentation tools, but little automated assistance for beginners.

Persuasion 4.0

PRO: Includes PC and Mac versions; creates Web shows.

CON: Rudimentary drawing tools, little assistance for beginners.

VALUE: Most users will prefer PowerPoint or Freelance.

Adobe

800/685-3505

http://www.adobe.com/

List price: $395, upgrade from earlier versions $129

READER SERVICE NO. 757

QUICK TAKES

HiJaak's Graphics Gem

Graphics file formats proliferate like weeds. Most people who work with graphics professionally encounter new file types often and need to format work in multiple file types. HiJaak Pro 4.0 for Windows 95 comes to the rescue. This 32-bit utility provides conversion filters for more than 85 graphics formats, including some new 3-D formats. The program also lets you catalog your images for searching and browsing. As before, HiJaak includes a screen capture utility for taking snapshots of software on your PC screen. HiJaak Pro 4.0 sells for $279. Quarterdeck Corporation, 310/309-3700.

READER SERVICE NO. 756

Procomm Plus Beats the Competition

COMMUNICATIONS

WINDOWS 95 comes with respectable basic communications tools, but some people demand more. Quarterdeck's 32-bit **Procomm Plus for Windows 95,** the latest comprehensive communications package, offers a more understandable and integrated interface than its closest competitor, Symantec ComSuite 95. ComSuite 95's Winfax remains the feature king of faxing. But if you want to run just one communications package, Procomm Plus is it.

Beyond the Windows 95 look and feel, Procomm Plus offers new remote-control functionality, Caller ID logging, and TAPI compliance. (Applications with TAPI compliance can share a modem without contention. TAPI will also support future devices like USB Modems when Windows 95 supports them.)

The remote-control features work fine for typical business applications. The client software would sometimes crash when running PC WorldBench tests remotely, but these tests are unusually demanding.

Quarterdeck didn't ignore the basics. Procomm Plus for Windows 95 also provides robust fax tools with annotation and optical character recognition, 37 terminal emulations, and BBS and QWK mail capability. With the included scripting language, you can automate communications or online tasks. For instance, your office PC can pull stock prices from the World Wide Web and fax you a daily customized report at home in time for your morning coffee. A bundled copy of Microsoft's Internet Explorer 3.0 is seamlessly incorporated.

—*Kevin Mitchell* ▶

Procomm Plus for Windows 95

PRO: Well-integrated interface, remote-control features, support for automated communication tasks.

CON: Remote-control features may not work with industrial-strength software.

VALUE: Solid communications tool.

Quarterdeck

310/309-3700; 800/683-6696

http://www.quarterdeck.com

List price: $179

READER SERVICE NO. 758

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individual addresses and ZIP Code boundaries, add notes and lines, and measure distances and areas on incredibly complete, detailed maps. With an Internet link, Street Atlas USA 4.0 also displays current information about weather, events, and road construction right on your map. To find your current location anywhere you go, just add your

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[DICTIONARY OF THE FUTURE, PAGE 531]

lost (lôst) ***adj.*** [archaic] **1.** unable to locate one's position, as in, "Help. I am lost." **2.** having no sense of direction at all **n.b.** became obsolete in 1996 with the introduction of Street Atlas USA 4.0 and Tripmate.

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PC World 20 Best Upgrades

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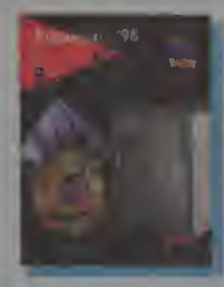

http://www.apcc.com/8014.htm

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multiple paths to your PC, Office™ gets there first

Protect ME! with APC

Bringing up the issue is awkward, but inevitable: You have a better chance of winning the lottery than of escaping power problems. Sooner or later, every computer user learns about surges, brownouts, spikes and blackouts. Unfortunately, most learn the hard way. Power problems are the single largest cause of computer data loss and hardware damage. If a power sag makes your modem drop the line while you're downloading a file from the Internet, or causes your keyboard to lock before you've saved work, you lose time, money and end up spending another late night at the office to meet your deadlines.

Only Back-UPS Office provides single device Multipath™ protection for all your equipment

The Multipath™ Power Protection Advantage	Traditional Surge Protector	Traditional UPS	Back-UPS Office
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AC	•	•	•
Data			•
Phone			•
Total Outlets	7	2	6
Number of Block Outlets			2
Protection from			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Typical Runtime in Minutes			
with Pentium 100 w/15" monitor		10	10
Battery backup for			
PC		•	•
Monitor		•	•
Storage Devices/Zip Drives		•	•
Full-time surge protection for			
Fax/Modem	•		•
Laser Printer	•		•
Speakers	•		•
Dataline protection for			
Internet or Network			•

Traditionally protecting all your equipment meant buying both a surge suppressor and a UPS. Even then only your AC line was protected. New Back-UPS Office protects all the paths to all your equipment.

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your computer's AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive PC.

Only Back-UPS Office provides true common ground protection

Figure 1

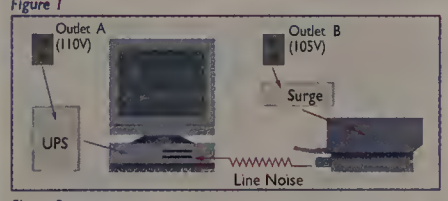

Figure 2

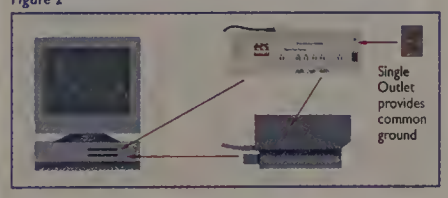

Figure 1: voltage differentials between multiple outlets create line noise and data glitches.
Figure 2: Back-UPS Office's common ground design eliminates the danger of voltage differentials.

Until now, protection for your entire system required several devices. But multi-device protection can leave you vulnerable to line noise and unwanted data glitches created by voltage differentials between outlets.

Back-UPS Office provides reliable, true common ground Multipath™ protection for your entire system. Instantaneous battery backup ensures uninterrupted operation of your CPU, monitor and external storage devices. Full-time surge suppression spreads a safety net around any remaining integrated peripherals, like modems, printers, speakers, and phone systems. Back-UPS Office's convenient BlockSafe™ outlet spacing handles all size plugs.

Back-UPS Office protection means true Multipath™ protection, clean, safe power to every peripheral, and instantaneous battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, guaranteed up to $25,000.

Protect yourself before you kick yourself. Get your new Back-UPS Office today (list price: $179.99), or call APC for a FREE 60-page catalog!

Ask for APC award-winning power protection wherever top-quality computer products are sold.

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800-800-4APC
401-788-2797 fax / 800-347-FAXX
http://www.apcc.com
132 Fairgrounds Rd., W. Kingston RI 02892 USA

Convenient BlockSafe™ Outlet Spacing
Back-UPS Office's outlets are spaced to accommodate all size plugs, including large transformer blocks. You don't have to sacrifice the use of any of your outlets if you use block plugs.

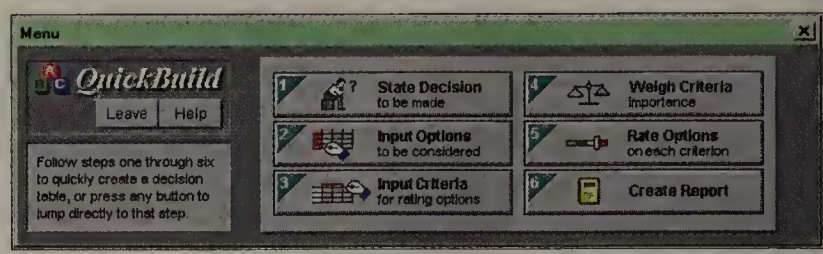
Internet Ready Fax/Modem Protection
Back-UPS Office's built-in phone line/10 Base-T network cable surge protection prevents data line surges from damaging internal and external modems, motherboards, input/output cards, and other system components.

Circle 45 on reader service card

Better Decisions: DecideRight Versus SureFire

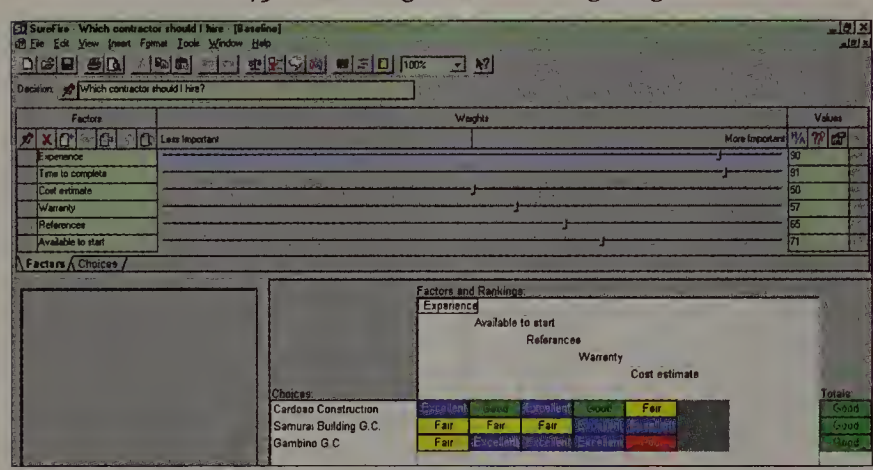
DECISION

MOST DECISION-support programs have a significant problem: The learning curve is too steep for people who need to make decisions before the next Ice Age arrives. But two new packages offer help to managers: Avantos's **DecideRight 1.2 for Windows 95** is simpler in its latest version. A newcomer, Beacon Rock's SureFire Decisions for Windows 95, is more affordable and powerful.



AVANTOS DECIDERIGHT 1.2 has easy-to-use features like QuickBuild, but SureFire works better for group decisions.

Avantos's $149 DecideRight 1.2 for Windows 95 provides a quick way to analyze decisions. You define your decision with DecideRight's QuickBuild feature, then list your options and the criteria for weighing them. You can also quickly create new scenarios for your decision framework. Press a button and you've got a report. On the negative side, DecideRight is a bit thin on group tools, though you can save summaries of documents in HTML format.



A SURE THING: SureFire Decisions works best for group decision-making.

But Beacon Rock's $79 **SureFire Decisions for Windows 95** is a better choice overall. Like DecideRight, it includes wizards and slider controls. It outdoes DecideRight by letting you rate intuitive as well as quantitative factors in your decision models. Better still, SureFire has a host of group tools. For example, you can take input from people and weigh and merge the results into a consensus. SureFire exports its reports, graphs, and tables in HTML format for an intranet or the Web.

—John Mello

DecideRight 1.2 for Windows 95

PRO: Makes it simple to build a decision from scratch.

CON: Better for individuals than for groups.

VALUE: Easy to use, but incomplete.

Avantos

800/282-6867

http://www.avantos.com

Street price: $149, upgrade $15.95

READER SERVICE NO. 759

SureFire Decisions for Windows 95

PRO: Merges a group's ratings to create consensus.

CON: Cluttered screen layout.

VALUE: More power, better value: the winner.

Beacon Rock

972/562-5878

http://www. beaconrock.com

Street price: $79

READER SERVICE NO. 760

Microsoft's New MBA-ware Does the Job

MANAGEMENT

USED PROPERLY, Microsoft's new **Team Manager 97** can help managers stay ahead of nonstop meetings, reports, and employee reviews—the basic chores of doing business. Team Manager works across a company's existing network and VIM- or MAPI-compliant e-mail system to share and update data, and it integrates directly with Microsoft's Schedule+ 7.0 and Outlook 97 programs.

Team Manager breaks into four major sections: People, Tasks, Notebook, and Vital Signs. Information in the People section may include such details as pay scales, contact data, and career goals; data in Tasks encompasses project descriptions, deadlines, and status reports. Managers can zero in on trouble spots using the Vital Signs section.

Team Manager also provides useful cross sections that let managers visualize relationships among employees and projects. The Task Organizer view, for example, makes it easy to see who is responsible for which projects and see their status. The Workload Planner lets managers gauge employee work levels.

Team members get a truncated view of the complete data, enabling them to track their own status and to update appropriate records.

With its familiar Microsoft Office interface, Team Manager 97 puts a friendly face on a challenging problem. But you'll only get out of Team Manager what you put in: You must be disciplined about updating the information. On top of that, the numerous overlapping relationships can get confusing, though the generous help system and wizards do ease the learning curve.

—Michael Desmond ▶

Microsoft Team Manager 97

PRO: Simplifies daily tasks; integrates with e-mail and networks.

CON: You must invest time to keep information current.

VALUE: A useful weapon to tame the management beast.

Microsoft

800/426-9400

http://www.microsoft.com

List price: $109, five licenses $469

READER SERVICE NO. 761

Shockwave™ and Capitol Records Produce Another Smash Hit.

a truly compelling interface that takes advantage of Shockwave's streaming audio from SoundEdit™ 16 *plus* DECK II™. Macromedia xRes™ helps us edit high-resolution images, and Extreme 3D™ takes us to another level in 3D. We'll continue to use Director and Shockwave in the future, and soon we'll have entire CDs right on our site."

because of its superior sound quality. With it, we breathe new life into both old and new hits on our virtual jukebox. By using Director, we get the flex bility to create

Capitol Records' Robin Bechtel on the Director® Multimedia Studio™ with Shockwave™: "We chose Shockwave

Now with streaming audio, Shockwave™ is producing hit after hit on the World Wide Web. Take this virtual jukebox at Capitol Records, created with the Director Multimedia Studio™ entirely for Shockwave. "We use Macromedia because they're dedicated to pushing technology to the limit," said Robin Bechtel, senior director of new media at Capitol. "With Shockwave, we're at the forefront of a new frontier in multimedia and Web audio. As a medium to get music to the masses, it's the best thing going." But don't just take her word for it. First, see and hear for yourself by getting Shockwave free at our Web site, where you'll also find a link to Capitol Records. Then give us a call today. And you'll become a multimedia sensation overnight.

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Circle 139 on reader service card

Type, Click, and Write With a Single Peripheral

INPUT

PC INPUT DEVICES are like breakfast cereal: No single choice pleases everyone. Some people prefer stiff keyboards, some like mushy ones; some people like a standard mouse, others favor trackballs. Cirque has integrated its GlidePoint touchpad with a regular desktop keyboard. If you like the combination, the **Cirque Input Center** is a great value. And the company has sweetened the recipe by adding new pen capabilities.

The Input Center includes a handy area for resting your palm, but you need lots of space: When connected to my PC on a narrow desk, the Input Center hung out over the edge. The GlidePoint touchpad, which sits below the cursor keys, is definitely an acquired taste. But it grew on me. Especially handy is the ability to tap the GlidePoint surface instead of using separate mouse buttons. (They're still available.)

You may also use the included stylus pen on the GlidePoint surface. With a light touch, you can use the stylus to move the cursor. Pressing a bit harder accesses a "laying ink" feature that enables you to add your signature to a fax or do some sketching. This feature wasn't included in the prerelease version I tested. My left-handed wife noticed one problem: The placement of the touchpad makes using the stylus almost impossible for southpaws.

As with any keyboard, try before you buy.

—*Stan Miastkowski*

COMFY KEYBOARD: Cirque's affordable Input Center integrates a keyboard and touchpad with pen input.

Cirque Input Center

PRO: Well-integrated multipurpose peripheral.

CON: Not for lefties.

VALUE: Reasonable price if you like the parts.

Cirque Corp.

800/454-3375

http://www.glidepoint.com

Street price: $99

READER SERVICE NO. 763

QUICK TAKES

Grade-A Phone Book

Pro CD's 1997 version of Select Phone Deluxe has been upgraded and updated to make mailing lists, telemarketing, and market research easier to manage. In addition to supplying the contents of five regional phone books, the $149 Select Phone Deluxe now includes AT&T's Free Phone directory (AT&T 800 numbers), a Business-In-One disc (U.S. corporate listings on one CD-ROM), and a free quarterly update. A full year subscription (which costs $279) buys four quarterly updates. If we had to purchase a single phone CD-ROM package, this would be our choice. Pro CD, Inc., 800/224-4732, 508/750-0000, http://www.procd.com.

READER SERVICE NO. 762

ViewSonic P815 Advances Monitor Technology

MONITOR

FOR GRAPHICS professionals ready to step up from a 14- or 15-inch monitor, **ViewSonic's P815** represents the current state of the art. It's a big monitor in size (21 inches), weight (61 pounds), and price ($1995). In fact, the P815 tops even ViewSonic's high-end Professional Series. You can pay less for a 21-inch monitor, but the ViewSonic doesn't skimp on anything, and it pushes the envelope of current technology.

The P815 has a maximum resolution of 1800 by 1440, and its ultrahigh bandwidth and broad horizontal scan range deliver that resolution at an easy-on-the-eyes refresh rate of 76 Hz. If you need a resolution of "only" 1600 by 1200, refresh is a rock-steady 90 Hz. Not many graphics cards support 1800 by 1440, but that's changing. I tested a shipping version of the P815 with the $695 Artist Graphics 2000I card (at 256 colors); but the newest 4MB versions of the Matrox Millennium and the Number Nine 9FX Motion 771 also support that very high resolution.

The P815 shows how far technology has come since I bought a 21-inch monitor last year. Some big screens show inconsistencies, but the P815 is bright, sharp, and uniform from edge to edge of its 20-inch viewable area. The P815 has a .25mm dot pitch and employs a special high-contrast, low-transmission glass that makes the colors amazingly brilliant. And the tube comes with an effective antiglare coating.

Plainly, the P815 isn't for everyone. But if you do serious graphics work or spend your day with your PC, it can be an eye-saving investment.

This monitor won't be obsolete anytime soon.

—*Stan Miastkowski* ▶

ViewSonic P815

PRO: Razor-sharp 21-inch monitor, supports top resolutions.

CON: Heavy and comparatively expensive.

VALUE: Worth every penny if you live and breathe graphics.

ViewSonic Corp.

800/888-8583

http://www.viewsonic.com

Street price: $1995

READER SERVICE NO. 764

New ATI 3D graphics upgrades put A WHOLE NEW SPIN on the way you view your computer and TV.

Everywhere you look, eyes are popping and heads are spinning over the new ATI 3D PRO TURBO PC2TV™ and the 3D XPRESSION+ PC2TV™ graphics upgrades. The only ones with the *PC2TV* feature that uses your big screen television (in addition to your monitor) for awesome business presentations and in-your-face game playing. You'll get the best possible combination of 3D, 2D and full-screen video, with more features built right onto the board than you get from Matrox, Diamond or anyone else. You also get 16.7 million brilliant colors at 1280x1024 resolution, plus the smoothest TV-quality video playback today. All of which means startling improvements in realism and response from multimedia, games, business apps and Web graphics. And both come with the free ATI Software Superpak with today's hottest 3D games and 3D Web Browser software. See your dealer now or see more about them at www.atitech.ca.

COMPARISON	3D XPRESSION+ PC2TV	3D PRO TURBO PC2TV
Use	Games, Home, Business	Power Users, Engineers, Graphics Profes[illegible]
Maximum 3D Resolution	1024x768	1600x1200
Maximum Resolution	1600x1200 @ 60Hz	1600x1200 @ 75Hz
Memory	2MB or 4MB (2MB upgradable to 4MB)	4MB or 8MB (4MB upgradable to 6/8[illegible])

NOW YOU SEE IT.™

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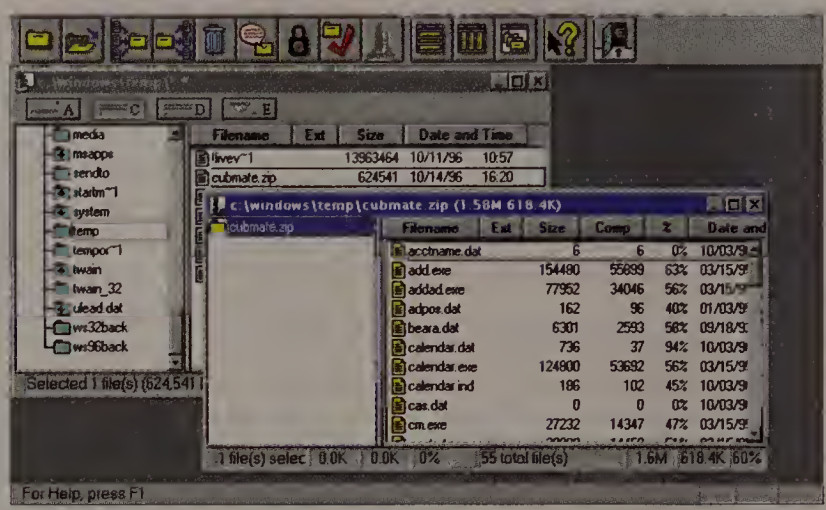
Circle 5 on reader service card

ProZip's Nice Interface Is Not Enough

UTILITY

NO MATTER HOW large your computer's hard disk or how fast your Internet connection, big files can put the squeeze on, demanding more resources. **ProZip**, one of many Windows file-compression programs available, shrinks files to manageable size. Using ProZip to compress and expand files could hardly be simpler. I used it on a Windows 95 PC; it also runs under Windows 3.*x*.

ProZip lets you drag and drop files to move them in and out of an archive (just as you would move them in and out of a folder), or between two archives. You decide the level and speed of compression, assign passwords, and adjust other settings in the Preference window. Despite the simplicity of these controls, I found a few problems: For example, the Cancel and OK buttons in the Preference window did not work in the shipping copy I reviewed.



NEW COMPRESSION TOOL: ProZip lets you look inside any archive as if it were a folder. But overall, it doesn't beat the competition.

ProZip elegantly handles self-extracting files. When you double-click the file, ProZip asks for the correct destination folder and lets you browse before picking the right place to expand the file.

But in a couple of ways, this $40 program falls short of its popular competitor, PKZip for Windows 95, which sells for $49. Unlike PKZip, ProZip doesn't support long file names, nor does it provide right-mouse access through Explorer. Overall, there's no compelling reason to choose ProZip over PKZip.

—*Peter Scisco*

ProZip

PRO: Fast, built-in drag-and-drop file archiving and retrieval.

CON: Limited Windows 95 support; small design problems.

VALUE: Not ahead of the pack.

RT Computer

800/891-1600

http://www.prozip.com

Street price: $40

READER SERVICE NO. 766

QUICK TAKES

The Newest Norton

Norton Utilities 2.0 appears to be a winner, providing a host of improvements and support for the new Microsoft FAT32 file system (included in the latest version of Windows 95, which comes preloaded on new PCs). People with this version of Win 95 shouldn't use older versions of Norton Utilities. One improvement, the System Genie, lets you customize a Windows 95 PC without having to delve into complicated Registry edits. The new LiveUpdate feature periodically checks Symantec's World Wide Web site and BBS for updates or patches, and then it enables you to download and install them. Virus scanning takes place transparently. Street price: $79, upgrade $49. Symantec, 800/441-7234, http://www.symantec.com.

READER SERVICE NO. 765

Improved UnInstaller Clears Out Old Files

UTILITY

MOST WINDOWS 95 PCs have a twilight zone where ghost files from deleted applications lurk. Not all new software has Windows 95's add/remove applet built in, and programs with the applet don't necessarily remove every associated file. But **UnInstaller 4**, MicroHelp's newest version of this Windows 95 utility, solves the problem.

It examines each file for recent usage and identifies any links to and from other files. It ranks files from unessential to critical (for example, it separates important system files from leftover clip art files) and then categorizes them by file type.

You can delete an application and its associated files completely or move them to another PC or drive.

UnInstaller 4 is far from automatic. You must open files to ensure that those it has slated for removal truly are "unessential." The program misdiagnosed some screen saver files on my system as unessential, so be careful what you delete. Fortunately, UnInstaller 4 also automatically compresses and backs up removed files, and it easily restores files that you've deleted erroneously.

In *PC World*'s last roundup of utilities ("Complete Guide to Windows Utilities," June 1996), Uninstaller 3.5 did a poor job of removing files associated with long-deleted applications, but this upgrade does a better job. In addition, MicroHelp claims that this new version is up to 20 percent more effective than its predecessor at removing certain types of files.

—*Jeff Sengstack* ▶

UnInstaller 4

PRO: Simple to use, thorough system examination.

CON: No uninstaller program is perfect yet.

VALUE: Solid upgrade of very easy-to-use uninstaller.

MicroHelp

770/516-0899

http://www.microhelp.com

Street price: $40

READER SERVICE NO. 767

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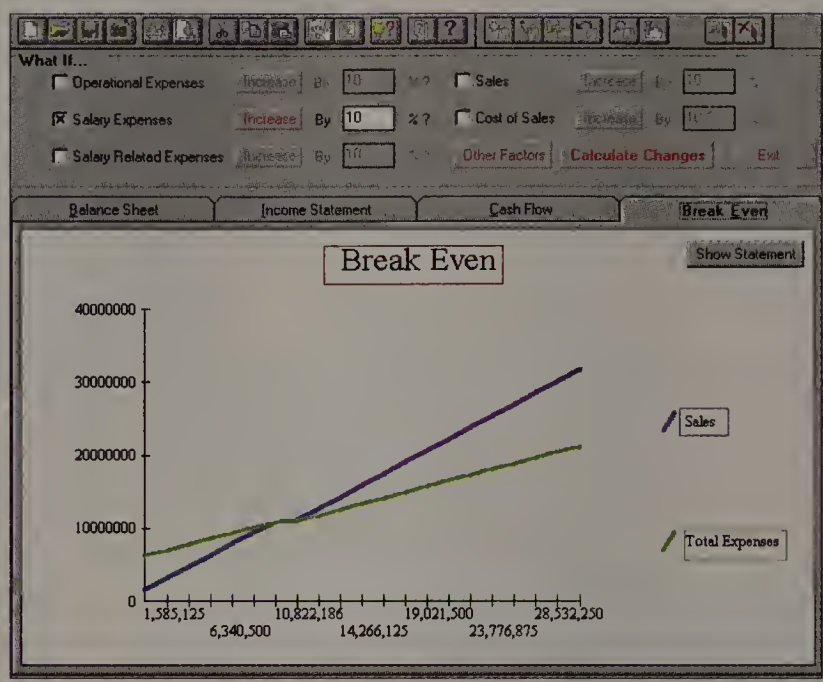
Circle 25 on reader service card

Business Maestro Handles Financial and Strategic Planning

BUSINESS

YOU EXPECT SALARY costs for your department to rise 12 percent this year, but sales might be flat. What would that do to your company's profitability? How can you plan accordingly? Put the figures into **Business Maestro,** and find out quickly. I tested a shipping version of Business Maestro—an analysis tool that orchestrates reports, what-if scenarios, and business plans in a single coherent package, at half the cost of some competing products.



BOTTOM-LINE IT FOR ME: Graph a break-even analysis with Business Maestro, using what-if scenarios and your company's financial data.

Building from your company's organizational chart and chart of accounts, you can customize the reporting and manipulation of financial data to isolate pressing issues. An integrated strategic planning guide helps you create a workable business plan with real-world figures. Templates and examples let you develop a strategy quickly; you can use the templates with popular word processors or with the built-in plan writer. Maestro imports from and exports to Excel and QIF formats.

An uncluttered menu structure and dialog boxes smooth the learning curve. The toolbar icons aren't always obvious, but that's a small quibble given the program's overall performance.

Business Maestro probably isn't the right program for a small business with few employees, a limited product line, and simple P&L statements. But department managers in bigger companies will find this application improves the financial modeling process and quickly pays for itself.

—Peter Scisco

Business Maestro

PRO: Easy to use financial modeling and strategic planning tools.

CON: Not for small businesses.

VALUE: At half the price of some competitors, it merits a long look.

Planet Corp.
800/366-5111
http://www.planet-corp.com
List price: $995
READER SERVICE NO. 768

Suite for Small Business Misses the Mark

ACCOUNTING

DESPITE ITS NAME, **Big Business 2.0 for Windows** is an accounting and management package designed for small businesses. It's the first Windows 95/NT incarnation of a Macintosh program. Big Business has a raft of unique features. Also, it's priced rather reasonably. But ultimately, this program is overwhelmed by some major problems.

This $199 program packs the usual accounting tools, plus integrated personal information management, inventory management, and sales automation features. These capabilities help small business managers keep track of employees and projects. Big Business 2.0 also helps create Web-site catalogs and price lists. About the only thing missing is a payroll program—an unaccountable omission.

As with all programs in this genre, you have to put in considerable setup time to get the most from Big Business. But there are more serious problems. Big Business accepts only plain text input: It can't handle data input from other accounting programs unless they export to text format. Big Business exports its own data in text format.

The program's heavily icon-based user interface contains a quirky mixture of standard and nonstandard Windows buttons and menus. Most data screens are shown in boring monochrome.

Worse, screens don't scale to the resolution of your display. On my 1280 by 1024 display, Big Business's screens huddled sullenly in the corner, virtually unreadable.

Big Business 2.0 for Windows is a feature-packed set of business tools, but it's hard to get beyond the truly awful user interface and the import limitations.

The vendor is already planning a revision of the program that improves the interface and addresses some of our concerns.

—Stan Miastkowski ▶

Big Business 2.0 for Windows

PRO: Unique and useful PIM-centric approach.

CON: User interface needs major work.

VALUE: Don't buy unless you can live with its awful interface.

Big Software
800/711-7458
http://www.bigsoftware.com
Street price: $199
READER SERVICE NO. 769

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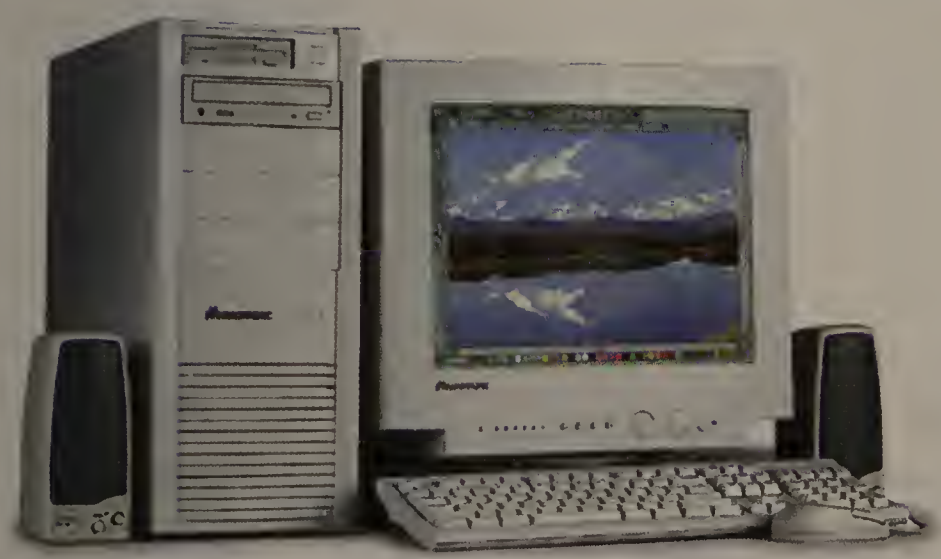

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Circle 140 on reader service card

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650CT

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- HiQVideo™ PCI graphics controller
- 16-bit Sound Blaster® Pro compatible audio system with speaker and microphone
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- Supports two Type II or one Type III 16-bit PC Cards, ZV Cards or 32-bit CardBus Cards
- 4.8 lbs.
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- Optional NoteDock™ II Enhanced Port Replicator
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How's this for computing brawn? 133MHz processing power and lightning-quick PCI architecture.

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11.3" dia.

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Considering its small size, the Portégé has a large 11.3" screen with brilliant active-matrix color.

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In Touch with Tomorrow
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Circle 228 on reader service card

Heavenly 3-D Graphics: Bryce 2 and Detailer

GRAPHICS

GOD CREATED the world in six days. Mere mortals can't compete with that pace, but thanks to MetaTools' **Bryce 2 for Windows 95/NT**, they can bang out a good-looking mountain range or two in minutes.

The $179 Bryce, named after a Utah canyon, is an addictive 3-D graphics package that lets you construct breathtaking scenes full of mountains, bodies of water, clouds, and other natural elements. Your creations can approach photorealism or be utterly fantastic; and you can easily customize them, view them from any perspective or distance, and save them as bit-mapped images for later use in other applications.

STUNNING SCENERY: Bryce 2's inventive tools let you create picture-perfect landscapes for use in other applications.

Like other MetaTools products, Bryce 2 has a stylish user interface that bears no resemblance to a typical Windows program. Its controls are oversize, three-dimensional gadgets. For the most part, Bryce 2's look is fun and functional, though it's occasionally hard to find the gadget you need.

Like Bryce 2, Fractal Design's **Detailer 1.0** is a powerful, easy-to-use 3-D graphics package. It takes the natural-media art instruments from Fractal's Painter image-editing program—paintbrushes, crayons, and the like—and lets you use them to decorate 3-D objects. You can apply these art materials to a flat, rectangular painting surface or to the 3-D object itself. You can't model 3-D shapes, but the program comes with predefined shapes and can import them.

Detailer 1.0 is an innovative tool for 3-D artists; but at $449, it's pricey for casual users.

—Harry McCracken

Bryce 2 for Windows 95/NT

PRO: Powerful 3-D landscape designer.

CON: Interface sometimes tricky.

VALUE: Fun way to design your own worlds.

MetaTools

805/566-6200

http://www.metatools.com

Street price: $179

READER SERVICE NO. 770

Detailer 1.0

PRO: Brings natural-media art to 3-D.

CON: Expensive.

VALUE: Unique 3-D painting tool for serious artists.

Fractal Design

800/846-0111

http://www.fractal.com

List price: $449

READER SERVICE NO. 771

CorelDraw 7 Offers Better Speed, New Look

GRAPHICS

CORELDRAW HAS long been the 800-pound gorilla of graphics software suites, and in the past, each new version added more programs to the bundle. But **CorelDraw 7** takes a different tack: It concentrates on some significant and very welcome improvements to the package's two core applications, CorelDraw and Photo-Paint.

For the first time in several years, CorelDraw's interface has changed significantly, yielding such innovations as a context-sensitive toolbar that alters according to the drawing tool you're using. The toolbar is a time-saver, although veteran CorelDraw users will need time to adjust.

Based on my experience with the prerelease version, Corel has improved the speeds of file loading, screen redrawing, and other time-consuming tasks.

CorelDraw 7

PRO: Faster; streamlined interface; lots of new features.

CON: Some old apps are gone.

VALUE: Solid upgrade focuses on refining core programs.

Corel

800/772-6735

http://www.corel.com

List price: $695, upgrade $249

READER SERVICE NO. 772

The many improvements include more accurate print preview and the ability to create semitransparent objects, such as stained-glass windows. If you have a graphics tablet with a pressure-sensitive stylus, you can draw with a calligraphic line.

Corel also has added Internet-oriented features. Now you can save files in the company's unique Barista format: It uses Java to convert CorelDraw images precisely for use in Web pages.

Photo-Paint now has the same context-sensitive toolbar and runs noticeably faster. My favorite new features are Image Sprayer, which splatters customizable images onto a picture as you move the mouse, and a filter that automatically improves color and contrast in photos.

Several of CorelDraw 6's secondary modules have departed, including the presentation and animation modules; but this isn't a tragedy, since those modules weren't top-notch. The 3-D illustration and multimedia file manager modules remain. As usual, Corel provides an ocean of clip art, stock photos, and fonts.

—Harry McCracken ▶

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-Erik Flink
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Web-Master by night

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LOGITECH

Products people love.

High-Tech Compass Meets Digital Map

MAPPING

DO YOU COUNT yourself among the perpetually lost? **Compass 3800,** a $289 bundle from Chicago Map, could help: It includes the Garmin GPS 38 (a handheld global positioning system receiver) and Precision Mapping 2.0 for Windows (digital street map software).

I like both the GPS 38 and Precision Mapping, which I tested in shipping form. The mapping software let me quickly search for a location by zip code, area code, or street address, and it tracked down a number of personal and business addresses that I needed. Navigating through the maps was fairly easy, but the mechanism could be improved. For example, panning across a map in small steps required repeated clicks of the right mouse button.

The GPS 38, which is about the size of a pocket cellular telephone, proved easy to use outdoors. It worked well when I went sailing or kayaking around San Francisco Bay. However, the model failed at the one task you're most likely to need it for—keeping you on course as you drive a car from point A to point B.

To get any kind of a fix in my Isuzu Trooper, I had to set the GPS 38 up on my dashboard. Unfortunately, the kit does not include a mounting bracket. As I navigated open areas, the unit tracked my direction and speed accurately. But when I drove around hills, through city streets, or under freeways, the Garmin 38 quickly lost its tracking ability. If you drive a convertible in Kansas, the Garmin 38 will most likely work fine. For the rest of us, the better setup is to use the company's Garmin 45 package with an external antenna—but this solution costs more than $500.

You can connect the GPS to a notebook PC, using the included 7-foot serial cable. The GPS sends your location, speed, and direction to the mapping software, which in turn displays your location on an actual map (down to a scale of a few city blocks).

Don't buy the Compass 3800 if you intend to use it mainly in a car. But if you want a map-based navigation system for diverse situations, this may be the least expensive package on the market.

—Tracey Capen

Compass 3800

PRO: Affordable GPS unit.

CON: Doesn't work well in the car, especially in cities.

VALUE: Okay if you planned to buy a handheld GPS anyway.

Chicago Map

630/257-7616

http://www.chicagomap.com

Street price: $289

READER SERVICE NO. 773

PointCast 1.1: More Content for News Junkies

ONLINE

AS YET, no company has copied PointCast's innovative strategy of building an information broadcast service over the Internet and projecting it onto a screen saver. Version 1.1 of the program expands on the simple concept by adding much new content, such as regional news from half a dozen major cities; stories culled from CNN, the *New York Times,* the Knight-Ridder newspaper chain, and Quote-.com (stock updates); worldwide weather updates; and more. Well-designed configuration dialog boxes separate these content choices into dozens of channels, which you can easily select, omit, and prioritize.

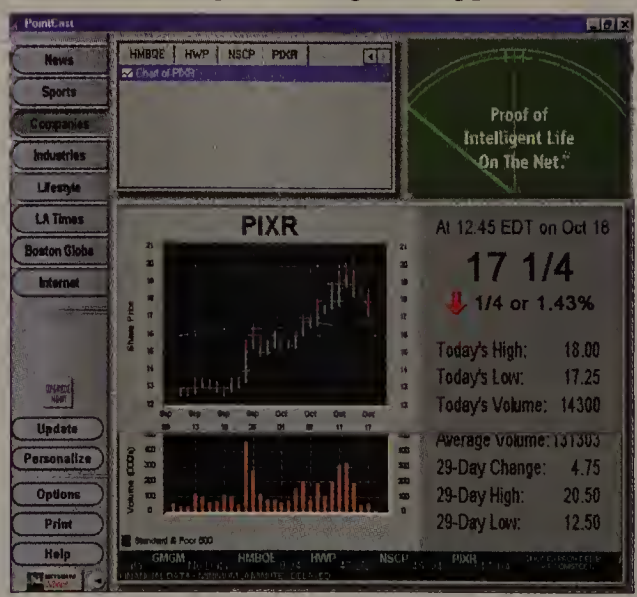
PointCast Network 1.1 has a simple embedded browser, allowing you to treat the network's ads as clickable sites (so fewer clicks stand between you and the information). In fact, it can integrate into Netscape Navigator 3.0 as a plug-in, but not into Microsoft Internet Explorer 3.0.

Though you can download PointCast at no cost, it also appears in retail stores bundled with an Internet starter kit and a month of free support for $20.

I got off on the wrong foot with the new shipping version 1.1 of PointCast's Network, making an installation error that prevented the program from running. The most knowledgeable tech support people in recent experience promptly recommended a successful fix, which resolved the problem.

It's hard to recommend PointCast 1.1 for anyone not connected full-time to a corporate LAN. Downloading updated content is critical if the product is to be of any service at all; but for people in the disconnected world, this task requires frequent connections and valuable processor and modem time. Still, you can't beat the price.

—Richard Overton ▶



POINTCAST 1.1 delivers more content from sources such as Quote.com, and the price is right.

PointCast Network 1.1

PRO: Improved data compression and channel selection.

CON: May not be practical for home users.

VALUE: Innovative, free Web tool.

PointCast

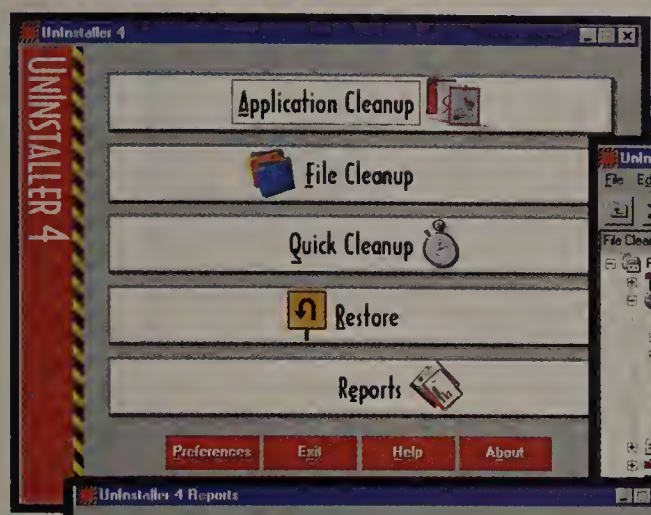
800/545-7677

http://www.pointcast.com

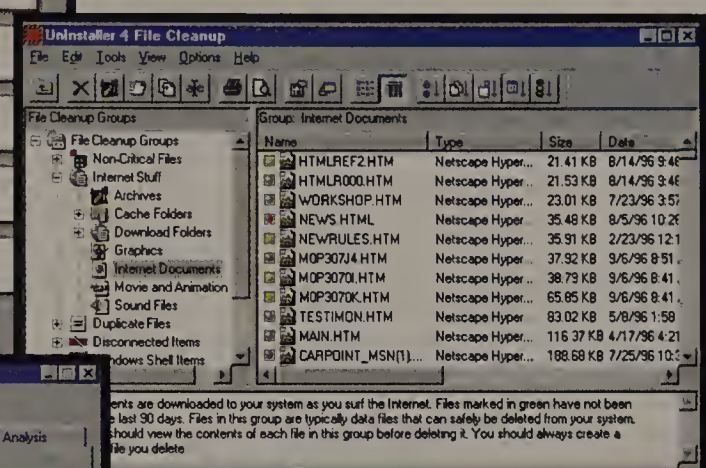
List price: free download, $20 retail starter kit

READER SERVICE NO. 774

UnInstaller 4 - More *Un* for the Money.

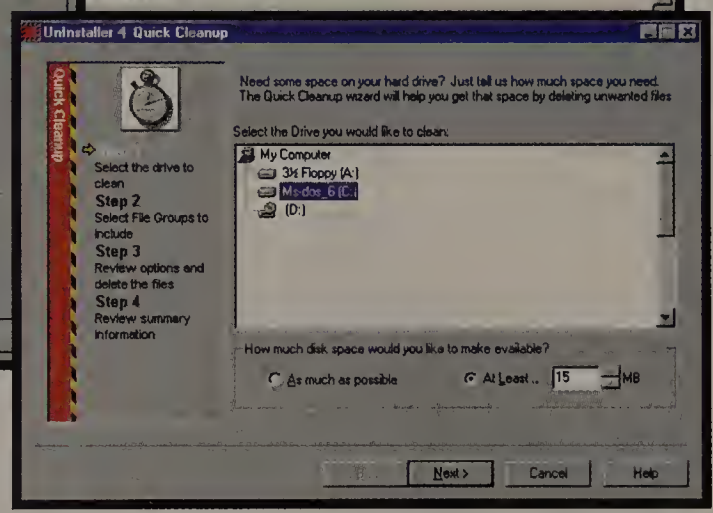


Need to clean up your system? UnInstaller 4's all new cleanup tools remove applications and files safely and easily.



Internet stuff building up on your system? Fonts and clip art you never use? Use File Cleanup for routine cleaning.

Want to see what's happening on your hard disk? New graphical reports give you the details.



Need 10MB fast? New Quick Cleanup frees up any amount of disk space you specify!

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Need disk space fast?

Are Internet cache files and downloads accumulating on your hard drive? Want to remove an application you no longer need? UnInstaller 4 is the answer.

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Get UnInstaller 4 and see for yourself why the #1 selling Windows cleanup utility is still the *Un*!

Call 1(800)922-3383 to order or visit your local software store today!

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www.microhelp.com

MicroHelp

HEY, EVERYONE CAN USE A LITTLE HELP.

Circle 153 on reader service card

Sound Decisions for Internet Audio

AUDIO

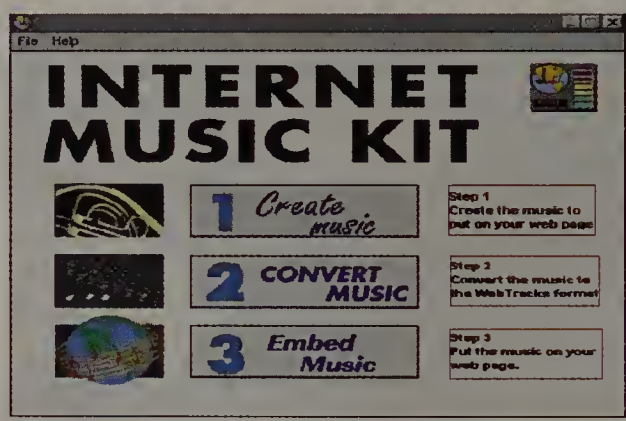
THREE NEW audio-related products can enhance your aural experience on the Internet. But only one of the three offers a big enough enhancement to receive our hearty endorsement.

That's the **Internet Music Kit**—a nifty utility that lets Web sites on a budget add instantly playable music to HTML pages. Until now, that capability required an expensive RealAudio server. With this utility, available from Wildcat Canyon Software's Web site, you can place any MIDI file on your Web page. You can even create one yourself with the Music Kit's simple composition utility. The file can be set up to play a musical greeting when visitors open the page or when they click on an icon.

Still, MIDI files are merely synthesized music with no vocals. The quality of reproduction can range from real-instrument fidelity to tin-can amateurism, depending on your sound card.

LOW-BUDGET SOUND CARD UPGRADE

IF YOU HAVE ONE of the tin-can cards, the **Roland Virtual Sound Canvas** software can help. It enhances music quality by running MIDI files through your PC's Pentium processor instead of through your sound card's FM synthesizer. The improvement can be dramatic, but the VSC has three glaring drawbacks. First, if you already have a wavetable card, such as the Sound Blaster AWE32, use of the VSC will decrease audio quality. Second, it's difficult to compose music using the VSC, due to a noticeable delay between your playing a note and hearing it. And third, it's expensive: The list price is $99. It ships only as one element of a four-part Music Pack that also includes DoReMiX 2 (a music creator), Cakewalk Express (a full-scale MIDI composer), and EasyJuke2 (a "jukebox" utility that plays MIDI files in random, looped, or selected sequence).



SOUNDS GOOD: Internet Music Kit lets you add music to your Web page at a low cost.

ADD AUDIO TO E-MAIL

FINALLY, IF YOU decide that you want to spice up your e-mail with audio and music, Midisoft's **Sound Bar** software simplifies the process. Using its microphone, you can create voice e-mail with a musical background, special effects, or any sound from a .wav file. The biggest drawback of Sound Bar may be its requirement that you use the cumbersome and difficult-to-configure Microsoft Exchange e-mail program.

—Jeff Sengstack

Internet Music Kit

PRO: Simple way to add sound to Web pages.
CON: MIDI only, no speech or vocals.
VALUE: Inexpensive and handy.
Wildcat Canyon Software
510/527-5155
http://www.wildcat.com
Street price: $49
READER SERVICE NO. 775

Midisoft Sound Bar

PRO: Easy way to add audio to e-mail.
CON: You must use Microsoft Exchange.
VALUE: So-so at best.
Midisoft
800/776-6434, 206/391-3610
http://www.midisoft.com
Street price: $30
READER SERVICE NO. 776

Roland Virtual SoundCanvas Music Pack

PRO: Enhances MIDI music for low-budget sound cards.
CON: Expensive; unnecessary for wavetable cards.
VALUE: Good if your sound card needs a lift.
Edirol
360/332-4211
http://www.edirol.com
List price: $99
READER SERVICE NO. 777

HTML Transit Prepares Documents for the Net

ONLINE

WITH THE appearance of intranets, many companies face the prospect of converting years' worth of documents into network-friendly HTML format. For this job InfoAccess invented **HTML Transit,** listed at $495. Transit, which I used in shipping form, converts documents from major word processor formats into HTML (it reads files as far back as Word for Windows 1, Word for DOS 3, WordPerfect 5, and Ami Pro 1.1). The program lets you control every imaginable aspect of page design and render diversely formatted documents as uniformly styled Web pages. But the tool may be too complex to learn and use, even for persons moderately familiar with the ins and outs of HTML programming. Corporate users may find it worth $495, but even they are likely to grow frustrated with an unfortunate two-bit mistake: Transit's developers did not provide support for long file names.

—Richard Overton

HTML Transit 2.0

PRO: Powerful way to translate documents into HTML.
CON: No support for long file names, hard to use.
VALUE: At this price, you'd better need it badly.
InfoAccess
800/344-9737
http://www.infoaccess.com
List price: $495, upgrade $99
READER SERVICE NO. 778

For more information about a product, contact the manufacturer or circle the number on the reader service card. ■

Seagate's all-new TapeStor drives are the effortless, affordable way to store and protect your valuable information.

You'll never need to worry again about system failures, power outages, or accidental deletion of files. With TapeStor, you'll have immediate access to all your backed up data.

Our stylish vertical design features an integrated power supply and cable. Whether you choose the 800 MB or 3.2 GB model, you'll have plenty of reliable capacity for backing up, archiving, or transferring your files.

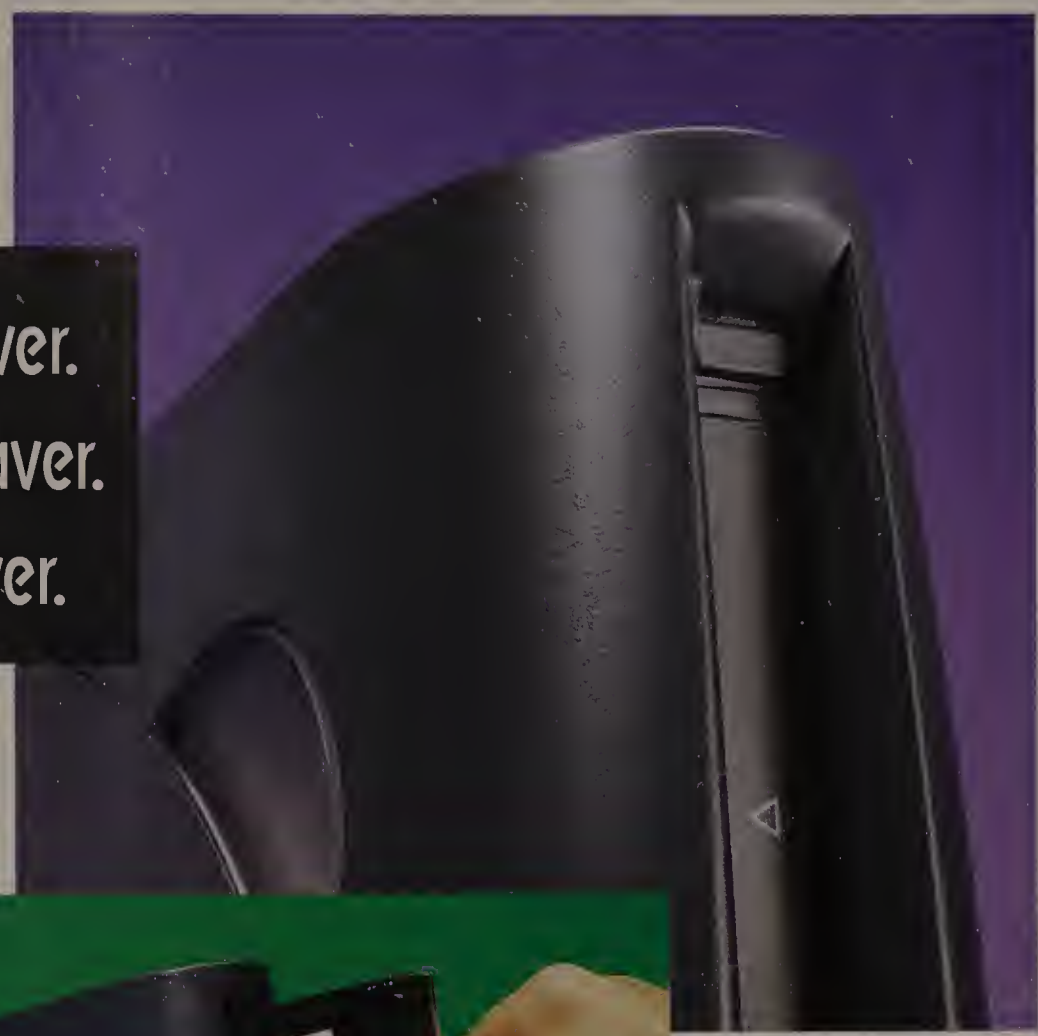
TapeStor drives install in seconds, connecting to the floppy disk controller or parallel port of your IBM compatible PC or workstation. The kit includes everything needed for installation, including a 4-step installation poster. Each TapeStor drive also comes with Tape-It™ for Seagate, a unique drag and drop backup and file management software program. This Win95 compatible program makes your tape drive look just like another disc drive, for easy copying and transfer of files between disc and tape.

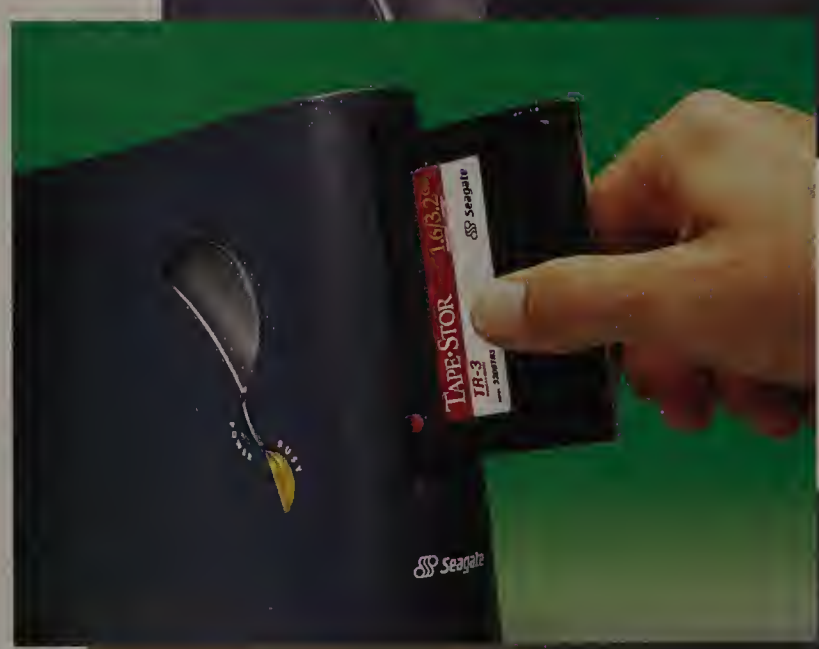
Seagate TapeStor drives use industry standard Travan media (the latest in tape storage technology), and are fully compatible with other Travan and QIC-compliant tapes. For more information, contact your local computer retailer, visit our website at www.seagate.com, or call 800-626-6637.

The all-new TapeStor drives from Seagate. Easy to use. Easy to install. Hard to do without.

A limited-time mail-in rebate is available from many retailers, including:

BEST BUY COMPUSA MICRO CENTER





Seagate

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Circle 209 on reader service card

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HP's NetServer LH Pro (left) is a superb workgroup server, while the NetServer LS4 offers great price/performance for enterprise servers.

TOP TEN NET SERVERS

HP takes it ALL

SOMETHING OLD, SOMETHING NEW, something Compaq, something Big Blue... but mostly things made by Hewlett-Packard.

This month the king of PC laser printers is also the king of PC servers, walking away with Best Buys for both workgroup and enterprise servers, although it gets very close competition from Compaq, Digital Equipment, and IBM.

We divide our reviews into Top 5 Workgroup and Top 5 Enterprise Servers. We rate each server on a combination of performance, features, pricing, reliability, and service and support.

Pentium Pro models are climbing our Top 10 list, but Pentium systems remain competitive. Also note that some servers now arrive with enhanced installation and management tools. ▶

INSIDE

112 **Put Your Own Web to Work**
Group applications grow more attractive on your intranet.

EDITED BY
Eric Bender

BY DAVE KEARNS AND WILLIAM L. RINKO-GAY

PHOTOGRAPH: ROBERT CARDIN

WORKGROUP SERVERS

1 HP NetServer LH Pro

PRO: Top performance, strong software tools

CON: Premium price, mediocre Oracle speed under Windows NT

THE LH PRO comes in the same short and wide configuration as all earlier NetServer LH models, but it features a Pentium Pro-200 CPU (upgradable to dual processors),two integrated Adaptec adapters, and four hot-swappable Seagate 1GB drives. It's easily the fastest workgroup server we've tested overall, and it posted the best scores for file service and Lotus Notes performance under Windows NT, plus Oracle database performance under NetWare.

The $8527 model we tested had eight slots open—four PCI, one PCI/EISA, and three EISA—as well as three externally accessible drive bays. HP also provides a well-thought-out server installation and management tool, NetServer Navigator, that comes on a bootable CD-ROM.

2 Digital Prioris ZX 5166

PRO: Strong performance, reliability features

CON: High price, slow NetWare file service

AT $9100, THIS is the costliest workgroup server among the 11 we reviewed for this issue, but it offers excellent performance, support, bundled software, and fault tolerance options for organizations that need those extra features.

The ZX features a Pentium-166 processor with 1MB of dedicated secondary cache; you can expand to four P-166 processors with 1MB of secondary cache each. This small box also includes redundant fans, two 2.1GB Seagate hot-swappable drives, and two integrated Adaptec adapters. The model we tested had five externally accessible drive bays open and two PCI, two PCI/EISA, and four EISA slots available. Digital has updated its solid ServerWorks Manager tool.

This machine scored first in the NT Oracle test and second in all other tests except NetWare file service, where it did surprisingly poorly.

3 Compaq ProLiant 1500 5/133 Model 2100

PRO: Good software tools, hot-swappable drives

CON: Mediocre speed on Oracle and Notes tests

THIS MACHINE has the fifth-best performance we've seen in a workgroup server, good expandability, clean design, hot-swappable drives, and Compaq's leading-edge software installation tools and server management software. At $7555, it's also priced well below the NetServer LH Pro and Prioris ZX. The model we tested came with a Pentium-133 (it's upgradable to two CPUs) and two hot-swappable 2.1GB Seagate Barracuda drives. For more information, see our October review.

4 Digital Prioris XL 5133

PRO: Good performance for price, clean design

CON: Limited expandability

DIGITAL'S PRIORIS XL 5133 is well engineered, reasonably fast, and bundled with very useful server management software. It's a very good value at $5650. The Prioris runs sixth among the 11 machines in

PC WORLD

TOP 10 SERVERS

	WORKGROUP SERVERS	Overall rating	Street price	CPU/ RAM (MB)	Hard drives/ individual capacity (GB)	Comments	Reader service number
1	HP NetServer LH Pro 800/322-4772 www.hp.com	91	$8527	PPro-200/32	4/1	Fastest performance, clean design, strong software tools.	601
2	Digital Prioris ZX 5166 800/722-9332 www.digital.com	90	$9100	P-166/32	2/2.1	Excellent performance, high-reliability features, pricey.	602
3	Compaq ProLiant 1500 5/133 2100 800/345-1518 www.compaq.com	90	$7555	P-133/32	2/2.1	Good software tools, mediocre application performance.	603
4	Digital Prioris XL 5133 800/722-9332 www.digital.com	89	$5650	P-133/32	2/2.1	Good price/performance, limited upgradability.	604
5	HP NetServer 5/133 LH 800/322-4772 www.hp.com	88	$5540	P-133/32	4/1	Capable server, good price/performance.	605
	ENTERPRISE SERVERS						
1	HP NetServer LS4 5/166 800/322-4772 www.hp.com	92	$20,400	4 P-166/128	4/2.1	Great price, very competitive performance.	606
2	HP NetServer LX Pro 6/200 SMP 800/322-4772 www.hp.com	91	$31,400	4 PPro-200/128	6/2.1	Top file performance, good design, not cheap.	607
3	Compaq ProLiant 5000 6/200 800/345-1518 www.compaq.com	89	$30,899	4 Pro-200/128	4/2.1	Superb database server, mediocre price/performance.	608
4	IBM PC Server 720 800/426-3333 www.ibm.com	89	$26,000	4 P-133/128	6/2.25	Reasonable performance, very good upgradability.	–
5	ALR Revolution Quad6 166/512 714/581-6770 www.alr.com	89	$30,499	4 PPro-166/128	9/2.15	Very good database speed, expandable, lacks software tools.	609

Best Buy http://www.pcworld.com/networking/servers All products: 901

performance. The model we tested came with a Pentium-133 (upgradable to a dual-processor configuration), integrated Adaptec adapter and two 2.1GB Seagate Barracuda drives. For further details, see our October review.

5 HP NetServer 5/133 LH

PRO: Good price/performance and expandability

CON: Mediocre application performance

THIS WORKHORSE offers a good mix of performance, features, and software tools, and it's been attractively repriced at $5540. It comes with a Pentium-133 CPU and four Seagate 1GB SCSI drives and two integrated SCSI controllers. See our October review for more details.

ENTERPRISE SERVERS

1 HP NetServer LS4 5/166

PRO: Excellent performance, good design

CON: No free PCI slots as tested

THE NETSERVER LS4 is no longer the fastest enterprise server we've tested, but with its aggressive $20,400 pricing and strong features, it holds onto Best Buy honors against some very close competition. In performance, it does very well against the new Pentium Pro–based rivals, beaten overall only by the PPro-200–based Data General Aviion (see "Best of the Rest") and NetServer LX Pro.

The system we reviewed held four Pentium-166s (each with 1MB of secondary cache), 128MB of ECC memory (expandable to 768MB), and four hot-swappable 2.1GB Seagate Barracuda drives. All six PCI slots are taken by four HP 100Base-T network adapters and two integrated Adaptec SCSI adapters. For more information, see our October review.

2 HP NetServer LX Pro 6/200 SMP

PRO: Top file performance, good design

CON: Mediocre database price/performance

THE LX PRO OFFERS better expandability and high-reliability features than the older LS4, but at $31,400 it costs more than half again as much.

This is an outstanding file server, performing second only to the DG Aviion 4900-200. However, it's only 8 percent faster than the LS4 on Oracle tests and actually 9 percent *slower* at Notes.

The new chassis is large; it can hold up to 12 hot-pluggable drives and 6 other storage units. Our test machine came with six 2.1GB Seagate drives and two open PCI slots. It sports three hot-pluggable power supplies, and you can buy an optional RAID controller. The system comes with the same well-regarded management software as the LS4.

3 Compaq ProLiant 5000 6/200

PRO: Great database speed and software tools

CON: Mediocre performance for the price

THE PROLIANT 5000 we tested is one formidable machine, with an equally formidable street price of $30,899.

It came with four Pentium Pro-200 CPUs (each with 512K of on-chip secondary cache). It also featured 128MB of ECC memory (expandable to 4GB), specialized ultrahigh-speed processor and memory buses, dual PCI buses, four hot-pluggable 2.1GB Seagate Barracuda drives (expandable to 17.2GB internally and 361GB externally), Compaq's Smart-2 Array Controller (which can set up those drives as a redundant array), and other bells and whistles.

But results on our PC WorldBench for Servers suite were mediocre. The ProLiant 5000 posted the best times for our Oracle NT test. It also showed good speed on our Oracle test under NetWare 4.1, but overall, it trailed the four-CPU 166-MHz ALR Revolution and several other quad-processor machines in that test.

The ProLiant's biggest selling point is ease of management, including a major upgrade of the well-regarded SmartStart installation/management software. You can outfit the system with a wealth of optional redundant components.

This large machine has five hot-pluggable drive bays behind the front panel. The side panel allows access to all slots (two PCI and one EISA were available), memory modules, and processors. The two processor cards each hold two CPUs.

4 IBM PC Server 720

PRO: Good performance, excellent upgradability

CON: CD-ROM drive is on its side

IF YOU WANT expandability, IBM's PC Server 720 has it in spades. The model we tested, priced at $26,000, came with four Pentium-133 processors (each with 512K of secondary cache), 128MB of memory, and 13.5GB of storage in six 2.25GB Quantum Atlas drives. You can boost memory to 1GB and storage (with an external system) to more than 100GB. For more information, see our October issue.

5 ALR Revolution Quad6 166/512

PRO: Blazing database speed, very expandable

CON: High price, lacks software tools

THIS FOUR-PROCESSOR Pentium Pro machine is a great application server, well-designed, extremely expandable, and easily serviced. But at $30,499 it's half again as expensive as our Best Buy, and it lacks a complete suite of software tools. The model we tested had four Pentium Pro-166 CPUs, 128MB of ECC memory, and nine 2.15GB Conner drives. For additional details, see our October review.

Dave Kearns is a network consultant and writer in Austin, Texas. William L. Rinko-Gay directs the Network World–PC World Network Test Center.

Go Online for Web Server Tests

We've added Web server tests to our PC WorldBench for Servers suite. For first results, and complete results of all our tests, go to http://www.pcworld.com/networking/servers.

Best of the Rest

THESE MACHINES were reviewed but didn't make the Top 10 Servers chart:

Workgroup: Acer AcerAltos 900, AST Manhattan S6200, CSS MaxPro 1500 P5-166, Digital Prioris HX 5166, Panda Archistrat 4s Server (workgroup version), Tangent Alcazar II.

Enterprise: Austin IPC Affinity XE, Data General Aviion 4900-166, Data General Aviion 4900-200, Panda Project Archistrat 4S Server (enterprise version), Tangent Carthage.

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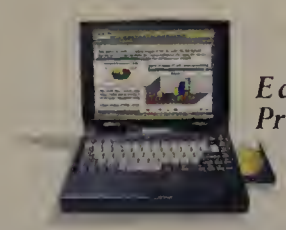

Echos Pro 150S

Echos Pro Notebook Standard Features:

Pentium® processor, PCI Bus, 256K L2 cache, 16MB RAM expandable to 128MB, 28.8K internal modem, 2 PC Card slots with PC Card Bus and Zoomed Video, Win 95 keyboard, Li-Ion battery, Multi-function bay: 8X CD-ROM and modular FDD (std.), second HDD (opt.)

NEW

Echos Pro 150S

150MHz Pentium® processor, 12.1" SVGA TFT display, 2GB Removable HDD

$4,999*

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Echos Pro 133S

133MHz Pentium® processor, 12.1" SVGA TFT display, 2GB Removable HDD

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133MHz Pentium® processor, 12.1" SVGA DSTN display, 1.3GB Removable HDD

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Put Your Own Web *to* Work

Group applications get friendlier and cheaper on your organization's intranet. Here are three of the best packages for sharing information—and work.

LET'S FACE THE FACTS, shall we? Your company is busily turning its network into an intranet, making services old and new available through a common Web browser. And the point of throwing all that fabulous Web pixie dust over your computers is not to let you enjoy cool multiuser fantasy games during lunch hour, to let the gang in sales post brochures, or even to give the H.R. folks a place to distribute those reference materials you check once a year.

No, the point of an intranet is to provide new ways *to actually let you work together better with other people*—coworkers, contractors, even those pesky folks known as your customers.

The Internet was born to let anyone interact with anyone else, or any other group. An intranet lets your organization turn the fantastic cornucopia of Net technology loose on collaboration, the thorniest of all business problems.

With an intranet in place, you've got the raw infrastructure for group applications. You don't need to install software on everyone's PC—they can just use their Web browser. You don't have to hire programmers with bad attitudes and expensive habits—slap on off-the-shelf applications instead. And while the main costs are in employee time, the software costs have plummeted.

Here are three leading group applications for your intranet, all priced at no more than $50 per user (not including server software). Attachmate's OpenMind, the best tool for document distribution and group discussions, is now being remolded for intranets. Digital's AltaVista Forum tackles a broader range of tasks than OpenMind. And the third product, SoftArc's FirstClass, just wants to be your everything, furnishing e-mail, group discussions, and, soon, full Net access.

OPENMIND: GROUPWARE WITHOUT HASSLES

GROUPWARE HAS A reputation for being complicated and costly to set up, and this reputation is richly deserved. In their demands for massive amounts of hardware and crack teams of professionals, some Lotus Notes rollouts are second only to Desert Storm.

Attachmate's OpenMind 3.0 offers a low-hassle groupware alternative: about 60 percent of Notes' power for about 10 percent of Notes' complexity. The package provides discussion forums and document management functions for an extremely reasonable cost of $75 for the server software and $50 for each user. You can even download a free five-user version from Attachmate's Web site, a good way to give the product a trial run.

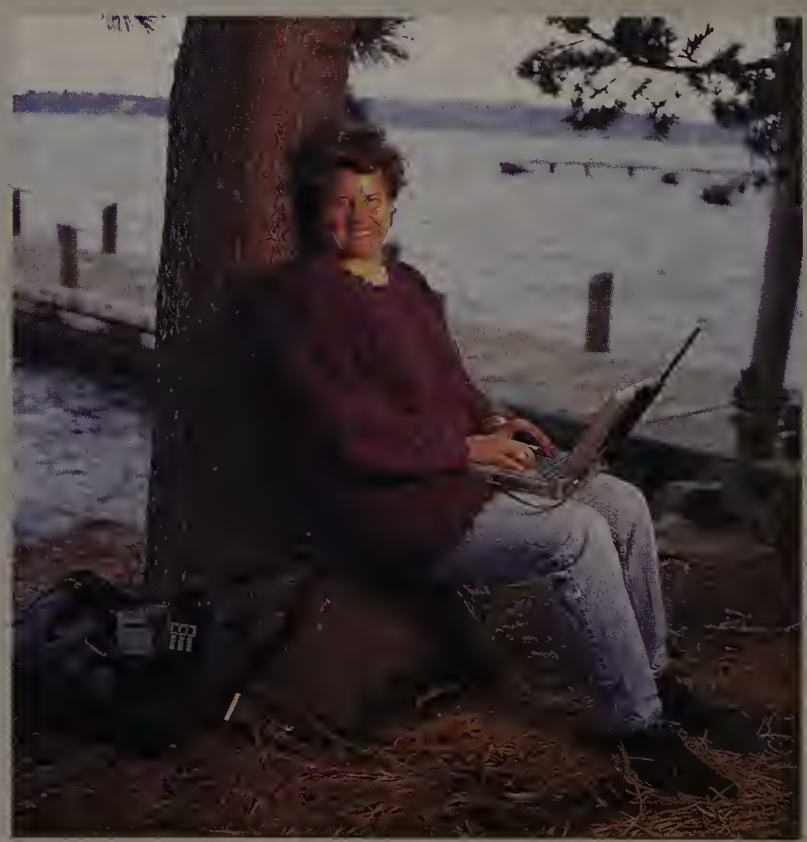
The OpenMind server software runs on either a Microsoft NT Workstation or an NT Server. OpenMind is simple enough to set up, if you can get a little help from your network administrator about how TCP/IP networking works. And the package's templates serve nicely as starting points for customized information ▶

Getting the Word Out to the Field

HERE IS A CLASSIC OPERATIONAL PROBLEM: You've got hundreds of field service employees in many locations across the United States—so how do you keep everyone in synch and get them the up-to-date information they need?

AT&T Wireless Services' Wireless Data Division, which operates a national cellular data network, uses OpenMind to help solve this problem, says Vicki Miller, director of information systems and services. More than 300 employees share technical documents, schedules, and other key information on an OpenMind server at the group's Kirkland, Washington, headquarters.

OpenMind 2.0 "just took off," says Miller. "It does not take a lot of administration at all," she adds. She expects to roll out the 3.0 upgrade soon after it ships. "We want to allow people with any Internet browser to get to OpenMind from the field."



AT&T's Vicki Miller says OpenMind "just took off." Over 300 staffers use it.

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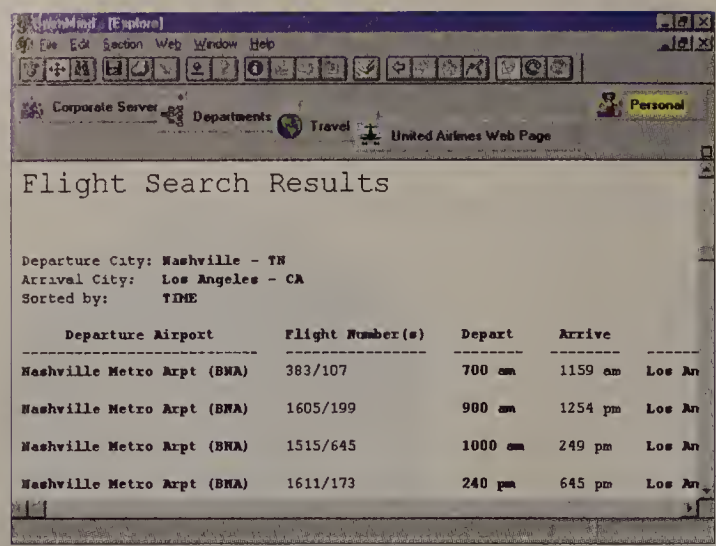


OPENMIND 3.0'S BUILT-IN BROWSER lets you view Web pages as easily as OpenMind discussions and documents.

databases. We had discussion forums and document sharing under way in less than an hour. Starting a new discussion forum is no more complicated than creating a new folder on your hard disk.

Unlike most groupware systems, OpenMind is also easy to keep running and to tailor to your organization's needs. For instance, you can let users add themselves to discussions, instead of requiring an administrator to create accounts.

OpenMind's client software runs on Windows 3.1, Windows 95, and Windows NT. Its built-in Web browser is no substitute for Netscape Navigator or Microsoft Internet Explorer, but it does let you build forums that display Web-based information as seamlessly as information stored by OpenMind itself. For example, a Travel Information forum can include links to airline and hotel reservation Web pages *plus* OpenMind documents that describe your company's travel policies.

And by the time you read this, you should be able to use any Web browser to participate in OpenMind discussions. (The OpenMind Web server add-on was not available for testing at press time.)

Besides offering easy access to Internet material, OpenMind 3.0 provides very well-rounded capabilities for information storage and retrieval. You can create simple text-based discussion messages using its rather plain editor, or you can attach documents, spreadsheets, graphics, or HTML files that can be viewed with its full-featured file viewer. Text information already stored in OpenMind can be indexed and retrieved using the high-powered Verity search engine.

You can also use OpenMind as a shared document management system.

The program lacks the form creation and workflow mechanisms found in Notes. You can't, for instance, automatically route information to a predefined list of recipients. It also has no built-in e-mail capability, though you can set up a $495 gateway to external e-mail systems.

What OpenMind does is make easy what other groupware makes hard.

—Bill Lawrence

OpenMind 3.0

PRO: Easy to use, excellent discussion forums and document sharing

CON: Not as broad as some group applications

VALUE: Unbeatable for information sharing

Attachmate

800/426-6283, http://www.attachmate.com/

List price: $75 (server), $50/user

READER SERVICE NUMBER 723

ALTAVISTA FORUM: SUITE COLLABORATION

BORN FOR THE World Wide Web, Digital Equipment's AltaVista Forum 2.0 lets you use any browser to establish teams to work on projects or manage enterprise-wide repositories of information.

The package bundles newsgroup access, group discussion, document sharing, calendaring, polling, and general search capabilities. Some of these features are not as polished as in rival packages, but Forum benefits from being a member of the powerful AltaVista suite, and the package is easy for a network administrator to install and run. We tested Forum 2.0 with Microsoft's Internet Information Server.

Once Forum is open for business, you check in at a home page dubbed the Summit, which gives you a view of all your options. You also can have a Personal Vista that stores your personal calendar; it lets others view that calendar, drop you a note via e-mail, send you a file, join in a structured discussion with you, and do real-time "chatting." Most strikingly, you can create an individualized Newsstand service on any NNTP-based (newsgroup) server. Newsstands are front ends for the AltaVista search engine, a version of which is bundled into Forum.

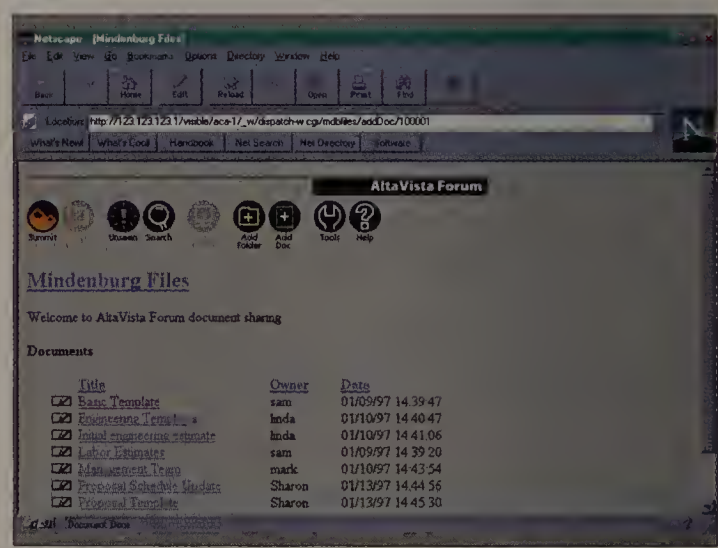
A Team Vista provides similar tricks for any teams of which you're a member.

Forum's calendars are easy to use, but not terribly useful. You get either a day view or a month view. You can submit a meeting request, and other potential attendees are notified via e-mail. When they accept or decline, you receive a message via e-mail as well. Unfortunately, you must then go back into the calendar to manually update the meeting entry. In addition, the calendar can't roll personal calendars into a team or Summit calendar.

The discussion forums aren't as slick as those in OpenMind, but they are threaded to make it easy to see who said what and when. The owner of the forum can set up message categories. Your messages can be text, include a URL to a useful file, or attach the file itself.

You can also poll users on a forum topic. Anyone who responds to the topic can "vote." AltaVista tracks responses and shows them in a handy graphical view.

A document-sharing forum lets you share documents in hierarchical folders much like those in Windows 95. Doc- ▶



ALTAVISTA FORUM MAKES IT EASY to share documents with a team or an organization via a standard browser.

While you're sitting there, something is happening in the world. It's called "the news." With PointCast, the Internet news network, you can get it broadcast straight to your desktop: weather updates, world news, sports, stocks, industry news and more. And suddenly your computer screen is transformed into a dynamic, multi-colored newswire complete with flying headlines, vibrant graphics and scrolling stock ticker. PointCast is completely customizable so you can get exactly the news you want. CNET awarded it the Best Internet Application of 1996 and *The Wall Street Journal* gives PointCast "'must-have' status for in-the-know computer owners." You can find PointCast at your local retailer or download it free at www.pointcast.com.

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A Firsthand Introduction to FirstClass

REMEMBER THESE frustrations from your college days? You couldn't make your professor's office hours because they conflicted with your class schedule. You missed a lecture and arranged to get notes from a classmate who never showed up. You pedaled all over campus posting signs about a student meeting, but nobody saw them. (Does this remind you of anything in your current job?) Students at Emory University in Atlanta avoid such hassles by going online with SoftArc's FirstClass, thanks to the foresight of biology professor Pat Marsteller. —Editor

Students come to class prepared for the day's lecture, eager to learn from each other and from us.

A FEW YEARS AGO, my son Sean Murphy and I met with area high school teachers to figure out how to keep them in touch with their mentors at Emory University. Afterward, Sean and I applied for and were awarded a minigrant from Georgia Tech to find a computer program that would bridge this gap in communication. FirstClass provided everything we needed and more.

After implementing the system for the high school teachers—dubbed LearnLink—a colleague and I decided to try FirstClass in our physiology class, in hopes it would give students more contact with each other and with us. We posted students' resumes (with photographs) and created conference folders for discussing class topics.

The students' response was exhilarating. Before LearnLink, they sat passively through lectures, then made a mad dash for the exits when class ended. Now, students come to class prepared for the day's lecture and eager to learn from each other and from us.

Today, 700 classes in all departments on campus are using FirstClass. Professors distribute course materials online. Students turn in assignments and exams electronically. Professors cut their office hours by communicating with students via e-mail. And everyone taps FirstClass to access Internet resources.

Professors in the Emory Medical School, for example, post all instructional materials for first-year medical students on FirstClass. Student organizations use FirstClass to notify their members of meetings. And students and faculty at Emory's two-year campus in Oxford, Georgia, connect to the Atlanta campus via FirstClass.

Professors receive one-on-one training on how to administer and customize the software. Typically, the professors then administer a conference for their classes. Within this conference, a professor can create a discussion area, a question-and-answer session, a chat area, and a drop-box folder for assignments and exams (which only the professor can read). Professors typically leave most of their conferences open. That way, all students can learn from the class, and students who may be interested in taking the class can view the online syllabus and browse the discussions before registering.

The free FirstClass client is distributed to students via the Web, floppy disk, or file server. Students moving into a dorm with PCs or Macs get the FirstClass client installed for them. The 60 percent of students who don't own computers can get onto the system from several large labs on campus.

Reading Ahead, Reaching Off Campus

ONE UNDERGRADUATE science research program used online discussions in FirstClass to enhance weekly seminars. Before the seminar, a professor would post a case study highlighting the topic. Program participants—students and researchers at the Centers for Disease Control—would then discuss the case.

During a course I taught on evolution, students kept an online journal in FirstClass, sharing their reactions to class readings. Across campuses, students from a biology class at the University of Virginia exchanged essays and assignments with students in a comparable class at Emory. And in my Women in Science class, I import related Usenet newsgroup discussions from the Internet into FirstClass so students can participate in them.

Our FirstClass system has increased students' interest in their classes. And that means they're learning more. —*Pat Marsteller*

ADMINISTRATOR SEAN MURPHY AND Professor Pat Marsteller enhance class discussions at Emory University with SoftArc's FirstClass system for e-mail and collaboration.

PHOTOGRAPH: ANN STATES

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uments can be attached files or simply text that you type into a dialog box.

It's easy to find your way around, and pages and menus are dynamically constructed as you click your way around the site. But often you find yourself retracing your steps rather than jumping to where you want to go. In addition, if someone else changes a page while you are viewing it, you need to reload the page or you won't see the changes.

Overall, AltaVista Forum is an impressive tool. It lacks Lotus Notes' inherent security and is a bit more difficult to navigate than Notes, OpenMind, and some other products. But the features it has are easy to set up and use, and the package is powerful enough to be a natural fit on many intranets. —*William L. Rinko-Gay*

AltaVista Forum

PRO: Good discussion and document support, full use of browsers

CON: Weak calendaring, some interface glitches

VALUE: Good tool in very strong intranet suite

Digital Equipment Corp.

http://www.altavista.software.digital.com/

Pricing: Starts at $495 for 25 users

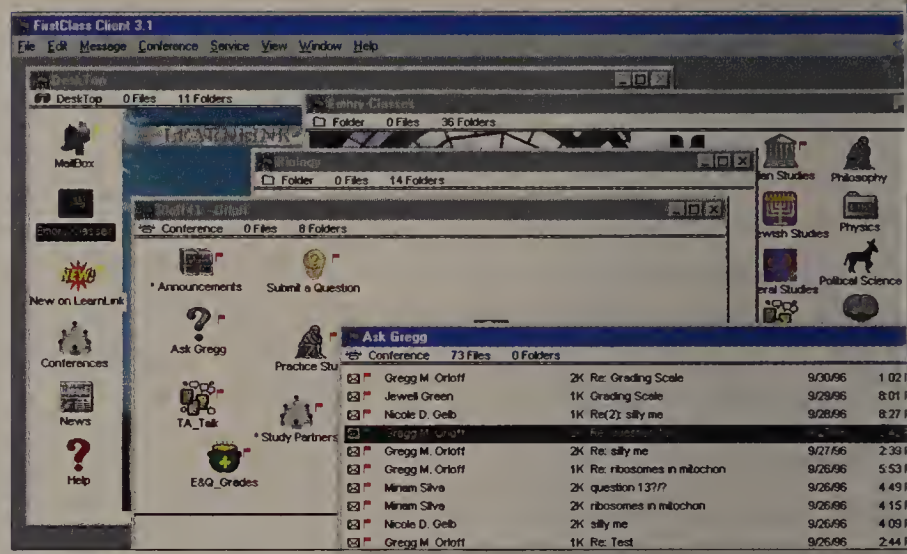
READER SERVICE NO. 724

FIRSTCLASS: MAC E-MAIL EMBRACES WINDOWS AND WEB

A VETERAN MACINTOSH e-mail system with simple group-collaboration tools, SoftArc's FirstClass has added a slew of enhancements and support for Windows, and it's now about to plunge into the Web. FirstClass offers a wide range of capabilities at a low price, but some of its quirks may puzzle Windows users.

FirstClass can't compare to Lotus Notes as a workflow tool, but it packs plenty of functionality into a more economical package and does far more than OpenMind and AltaVista Forum. It includes full-featured e-mail, group conferencing, real-time discussions, some Internet links, forms processing, database access, and now remote support for all features.

Group conferences offer threaded messages, public chats, and connections to Internet newsgroups. Users can organize messages into folders they create with the New Folder option from the Conference menu. Every message is signaled in the conference with an envelope icon (red for unread messages, white for unsent ones). Each group conference folder gets its own window. The FirstClass administrator can establish just about any kind of access to conferences that you might want.



FIRSTCLASS CONFERENCES help students and professors at Emory University learn from each other.

FirstClass lets you combine customized access controls for individuals or workgroups with custom e-mail forms for sophisticated applications without programming. FirstClass includes forms for phone messages, information requests, and purchase requisitions. You can also use the bundled FirstClass Designer to create your own forms for more tailored workflow applications. Tight database links let users query corporate databases via an information request form and get the results back in a graphical form.

> FirstClass bundles e-mail, group conferencing, real-time discussions, and forms processing—and will soon add full access via standard Internet clients.

Installation is straightforward for your net administrator, as long as he or she has some Windows NT networking savvy. Optional support is available for Macintosh clients ($495), text-only terminals ($495), or TCP/IP networks ($995).

Using FirstClass's Mac-like e-mail client on Windows can be disorienting, like switching between a stick shift and an automatic transmission. For example, every time you open a nested folder you open yet another window, quickly causing massive MacWindow clutter. This should be fixed in version 3.5 (shipping at press time), which will include such Windows features as right-mouse button support and a customizable toolbar.

Organizations with hardcore Windows users may want to wait for version 4.0, which is due early in 1997. In addition to introducing group calendaring and drag-and-drop To Do lists, it will let you use any Internet e-mail package as a client, and you'll be able to access all other FirstClass services with standard Web browsers.

FirstClass is a good, economical choice for e-mail and conferencing, especially if your network is a mixed bag.

—*Pete Loshin*

FirstClass Server for Windows 3.0

PRO: Economical, powerful group applications

CON: User interface glitches, Web browser support not available until early 1997

VALUE: Mainstream group tools in an attractive but idiosyncratic package

SoftArc Inc.

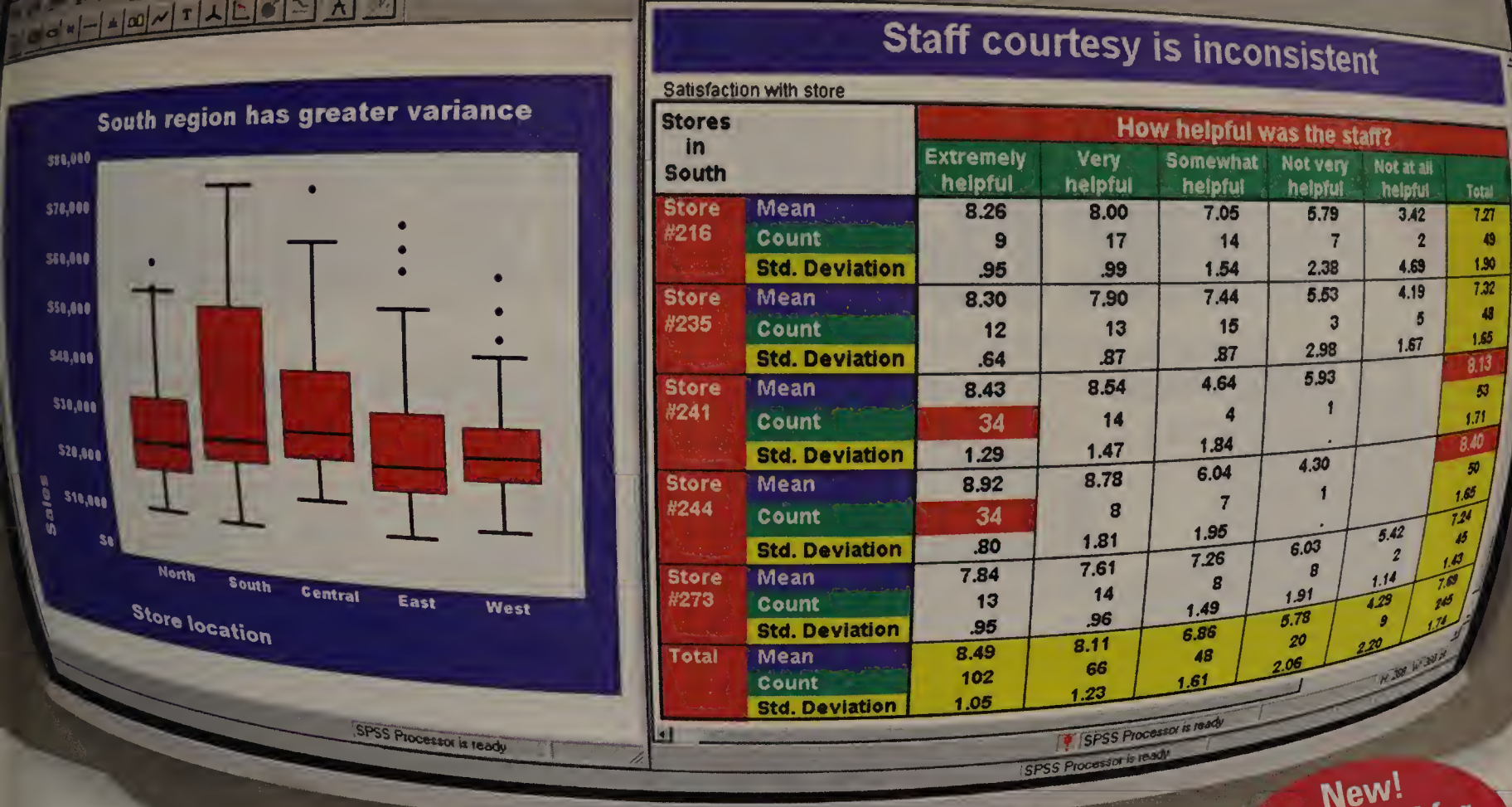
905/415-7000, http://www.softarc.com

Pricing: Starts at $495 for server and five users

READER SERVICE NO. 725

Bill Lawrence manages network computing for a major Western utility. Pete Loshin is an Internet consultant and author in Watertown, Massachusetts. William L. Rinko-Gay is director of the Network World–PC World Network Test Center.

For more information about all products in this article, circle reader service no. 913. ■



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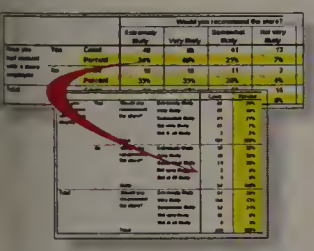

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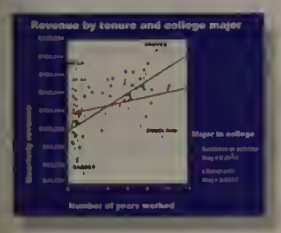

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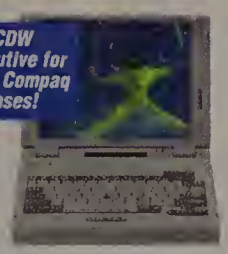

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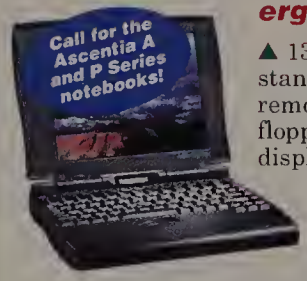

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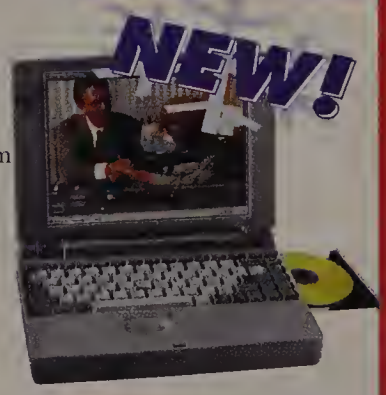

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NT 4.0 VS. 95

Should you make the move from 95 or 3.1 to NT?

The answer boils down to a basic trade-off: stability and security versus compatibility.

By Scott Spanbauer

TIMES CHANGE. It seems like only yesterday that Windows 95 made its debut with an avalanche of publicity, a Rolling Stones theme song, and midnight lines at Egghead. But as we ring in 1997, Win 95's very *name* shows it's no newcomer.

The formal upgrade to Windows 95 isn't due until mid-1997, when Microsoft plans to roll out a revised edition of the operating system, which may or may not be called Windows 97. As we discuss in "Windows 97: Already Here, Sort Of," this upgrade will consist largely of features offered first as Win 95 add-ons, such as the ability to use the Internet Explorer 4.0 Web browser as an alternative to the standard Windows desktop. ▶

ILLUSTRATIONS BY MATSU

Even now, though, Win 95 faces competition from another, newer member of the Windows family: Windows NT Workstation 4.0. This latest Microsoft desktop operating system may not have hit the market with quite the fanfare that accompanied Windows 95's arrival, but it's still a big event in the computing world.

After all, many Windows 3.1 users—including a large chunk of corporate America—chose to skip Windows 95 altogether. Loath to switch operating systems unless absolutely necessary, these users gambled that Win NT Workstation 4.0 would combine Win 95's much-improved interface with Win NT's traditional virtues—stability and security. And even if you moved to Win 95 long ago, you may wonder if Win NToffers any overwhelming advantages.

To help you select the best version of Windows for your needs, the PC World Test Center put both Windows 95 and the final shipping version of Windows NT Workstation 4.0 through their paces with a broad comparison of features, compatibility, and performance. We found much to like about Win NT—with a few big reservations. It's a technically superior, more secure OS that can keep buggy programs from crashing the whole PC. And unlike earlier NT versions, Win NT 4.0 demands only slightly more of up-to-date PCs than Win 95 does. NT requires a minimum 12MB of RAM, and Microsoft recommends at least a Pentium-60 CPU, though it can run on 486 PCs.

For most users, NT's biggest drawback is its limited hardware and software compatibility. Most of the products we tested ran under it, but there were some important exceptions, and NT's lack of Plug and Play hardware configuration didn't help.

Even in the best of circumstances, trying out a new operating system is a major undertaking, and Windows NT has its unique obstacles. First of all, you need a minimum 110MB of free disk space, which may prove a daunting amount of storage to give up unless you're absolutely sure Win NT is for you. What's more, NT isn't compatible with DOS's and Windows 95's DriveSpace disk compression. If you've compressed all your available disk space, you'll have to remove DriveSpace before installing NT.

Clash of the Features

Best of Win 95

Up-to-date interface: Win 95's look is far from perfect, but much superior to Windows 3.1's.

Highly compatible: Nearly all hardware and software runs well on Win 95; drivers are plentiful.

Better for aging PCs: Unlike NT, Win 95 can run on a 486 system with 8MB of RAM.

Worst of Win 95

So-so security: It's easy to bypass Win 95's password protection.

Retains DOS and Win 3.1 underpinnings: Helps compatibility, but lets buggy drivers and apps do more damage in Win 95.

Dial-up drudgery: Win 95's built-in TCP/IP Dial-up Networking is tough to set up (Win NT's is no better).

Best of Win NT 4.0

The same up-to-date interface: Finally, Win NT users can step up from Program Manager.

Safe and secure: NT offers more crash protection and much better security than Win 95.

Makes a great intranet server: NT's Web, FTP, and gopher tools let you distribute data to your workgroup.

Worst of Win NT 4.0

Compatibility problems: Some apps and peripherals won't work with NT, and there's no Plug and Play.

No easy upgrade to NT from Win 95: After installing NT, you'll need to reinstall apps and reconfigure your PC.

Traveling troubles: Notebook users won't get power management and full PC Card support from NT.

Windows 97

Already Here, Sort Of

DON'T LOOK NOW, but Windows 95 is due for a face-lift. Around mid-1997, Microsoft expects to ship the successor to Windows 95, code-named Memphis and often referred to as Windows 97. The new upgrade will feature a Web-ified interface that blurs the line between desktop navigation and online browsing, while packing new technologies and tweaking established features—all to ease use and fix bugs. Perhaps most surprising, you may be running a good deal of Windows 97 already.

97 in 95. Yes, Microsoft has been quietly but consistently updating Windows 95. The company's Web site boasts many Windows 97 features, from ISDN and infrared communications capabilities, to the beta of the latest Internet Explorer Web browser (it wasn't ready when we went to press, but Microsoft plans to have it up by the time you read this). New PC systems that ship with Win 95 preinstalled have OEM versions of Win 95 with the FAT32 file system and unified Windows 95/NT hardware drivers. Win 97 will put these incremental updates into a shrink-wrapped box, along with late-breaking features and a host of updated drivers.

A Web-like Interface. So is Windows 97 yesterday's news? Hardly. Click Windows 97's new Web View option under the View menu in Windows Explorer, and you'll be using Internet Explorer 4.0 to navigate your hard disk. File icons and the stuffy tree-and-list file system will be gone—replaced, Microsoft promises, with a three-pane visual scheme of hyperlinks and view windows that should give your screen the look and feel of a well-designed Web page. Internet Explorer 4.0 will also be able to give Windows NT 4.0 the same Web-style desktop. Microsoft's Active Desktop will use ActiveX components to put Web browsing, real-time ticker displays, and even television feeds directly onto the desktop. Microsoft says it is "decoupling" this user interface from the operating system to allow frequent surface updates without having to rerelease a whole new version of the OS every time.

Also, Win NT 4.0 requires its own drivers for devices such as video cards and printers; your existing DOS, Win 3.1, or Win 95 drivers won't work. NT comes with a healthy collection of drivers, but you may need to track down others—if they're available at all. Win 95 users face another barrier: Although you can put Win NT on a Win 95 system without wiping out the hard drive, NT doesn't pick up any of Win 95's settings. You'll have to reinstall every program and driver under the new OS.

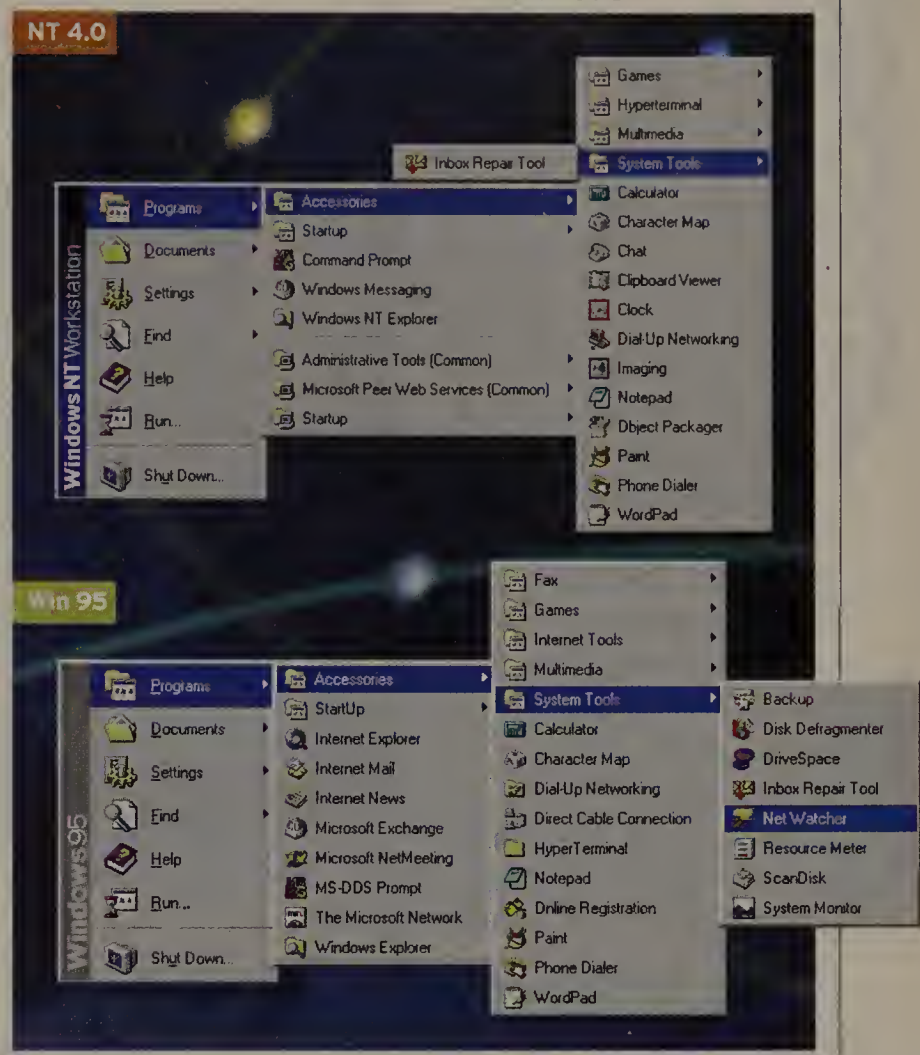
Fortunately, one Windows NT feature does reduce the pain of OS migration—a utility makes it easy to choose between two or even three operating systems each time you start your PC. It's a good idea to retain your old operating system in case a key application turns out to be incompatible with NT. Keeping the old OS available will also let you make the transition to NT gradually.

THE FINAL ANALYSIS

EVEN AFTER YOU KNOW the whole story on the contrasting strengths and weaknesses of Win 95 and Win NT, it's not an easy choice. Read the following detailed reports on both versions' features, compatibility, and performance to see how they compare.

As long as you've got a reasonably fast PC with at least 16MB of RAM, the decision boils down to opting for NT's better system security and stability and its intranet server software; or Windows 95's near-universal hardware and software compatibility, Plug and Play, and advanced support for portable PCs. If you find that everything works with NT except for one key item, you can always choose your old OS from the boot menu when you want to use that item. But Win 95 remains a better choice if you don't have the time or patience to worry about compatibility.

One other point in Win 95's favor: For most users, it's $200 cheaper than NT. That's because anyone with an old version of DOS or Windows qualifies for the $90 Win 95 upgrade, but Win NT's $135 upgrade is available only to users of earlier versions of NT. Everyone else has to pay the full $290 street price. And while Win 95 comes with 90 days of free phone help, NT comes with just two free calls; beyond that, you pay $95 per incident. ▶



WIN NT AND WIN 95 HAVE THE SAME INTERFACE. But look closely, and you'll spot some different features, such as NT's utilities for managing user accounts and intranets.

There will be lots under the hood, too. Windows 97 will feature a reworked file system—the previously mentioned FAT32—that conserves disk space and increases the maximum size of hard disks to 2 terabytes, though Microsoft admits that performance may degrade slightly in some applications. The so-called Windows Driver Model promises to let Windows 95 and Windows NT access peripherals using a single driver; this may help NT's spotty hardware compatibility, while tweaks to the Windows 95 kernel may boost the operating system's performance. The operating system will also include support for Intel's multimedia-savvy MMX additions to the Pentium's instruction set.

New Links. Look for changes in the way application files are linked; these should address problems that occur when a DLL is accidentally deleted and improve Windows 95's problematic uninstall capability. A reworked Control Panel will cut down on icon overload, with wizards to guide users through system settings. Network-oriented enhancements will allow PCs to poll a central server or Web page for new software to download updated components—a step toward the network PC model—as well as improve file synchronization for mobile users. For notebooks, Windows 97 will provide better power management, including the ability to shut down power-hungry PC Cards, and will support the upcoming 32-bit PC Card standard, called CardBus.

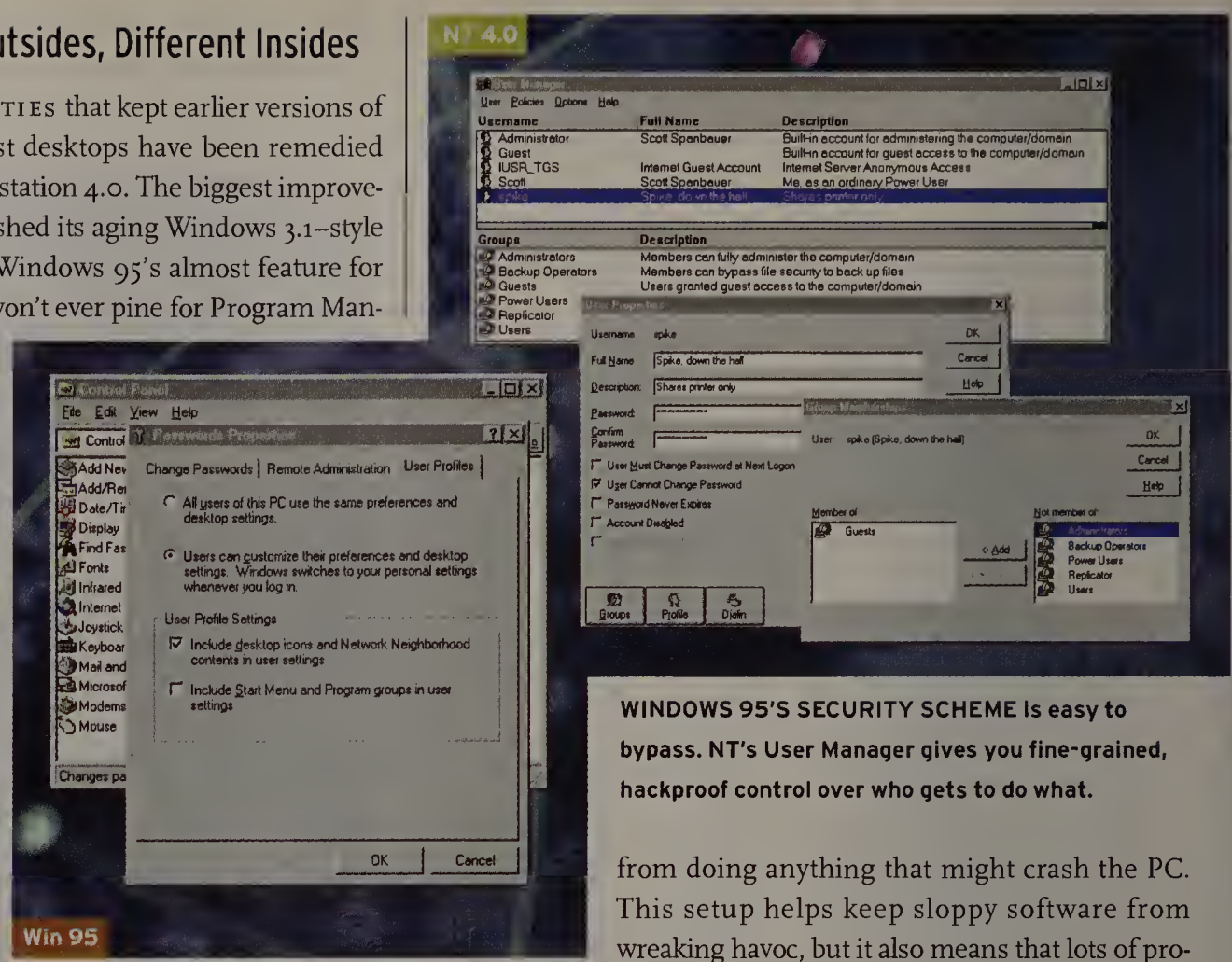
WINDOWS 97 can provide Web-like navigation of local directories, and even real-time Internet news feeds.

Despite the trickle-down updates and bits-and-pieces enhancements, Windows 97, or whatever it ends up being called, promises to be a significant release. The new OS continues to sidle closer to Windows NT, with unified drivers and a shared Web-style interface that may ease things for those using PCs at home and work. But why take our word for it? Much of it is out there for you to try right now.

—Michael Desmond

Features: Same Outsides, Different Insides

MANY OF THE LIABILITIES that kept earlier versions of Windows NT off most desktops have been remedied in Windows NT Workstation 4.0. The biggest improvement: NT has finally shed its aging Windows 3.1–style interface for one that matches Windows 95's almost feature for feature. Most Win 3.1 veterans won't ever pine for Program Manager, which both NT and Win 95 replace with the sleeker, more flexible Start menu and Taskbar, along with a more customizable work environment. Windows NT 4.0 also has Win 95 tools such as the Briefcase file-synchronization utility, the Exchange e-mail client (which Microsoft is renaming Windows Messaging), and the HyperTerminal communications program. Unlike Win 95, NT 4.0 ships without fax software. At press time, however, Microsoft had put a free beta version of a fax program for NT on its Web site (http://www.microsoft.com/ntworkstation/fax.htm).



WINDOWS 95'S SECURITY SCHEME is easy to bypass. NT's User Manager gives you fine-grained, hackproof control over who gets to do what.

APPEARANCES CAN BE DECEIVING

WINDOWS 95 AND Win NT 4.0 may look like twins, but substantial differences lurk under the hood. Windows 95 is nominally a 32-bit operating system, but it's retained some code from its 16-bit ancestors, MS-DOS and Windows 3.1. That code makes it compatible with the vast majority of hardware and with most DOS and Windows programs. Unfortunately, it also means that Win 95 has DOS's prehistoric, insecure FAT file system and is prone to some of Win 3.1's mysterious crashes and instabilities.

Windows NT, by contrast, was designed as a fully 32-bit operating system from the ground up. Besides running on garden-variety PCs, it takes advantage of multiprocessor systems and is available for several types of RISC workstations. Also unlike Win 95, there is a version designed to run large local area networks: Windows NT Server 4.0, which competes against such network operating systems as NetWare.

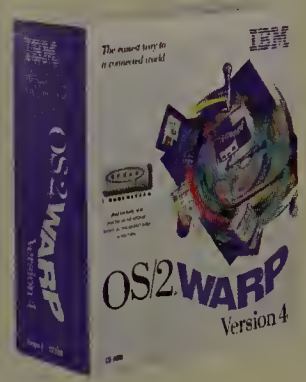
NT also goes several steps beyond Win 95 to prevent software crashes and to keep applications that do crash from bringing down other apps or the OS itself. More than Win 95, it insists that drivers and other software access the display, hard drive, and various components only through the OS's official procedures, so it can monitor what they're up to and prevent them from doing anything that might crash the PC. This setup helps keep sloppy software from wreaking havoc, but it also means that lots of programs, especially utilities and games, won't run with NT (see the Compatibility section for the gory details).

Both Win 95 and Win NT isolate 16-bit Windows and DOS applications into an area of RAM separate from 32-bit programs, so if one 16-bit app crashes, it's unlikely to take the OS with it (each 32-bit program is also segregated from every other). But NT has the capa-

OS/2 Warp

New Look, New Features

SELECTING AN operating system for your PC hasn't been reduced to choosing between Microsoft products—yet. Despite years of speculation that OS/2's death was imminent, IBM continues to upgrade its 32-bit operating system. OS/2 Warp 4 fixes some of the limitations of earlier OS/2 releases: Thanks in part to additional drivers, installation is much easier, and this new edition has a more colorful look, with better online help and a new feature called WarpCenter—a powerful, customizable equivalent of Win 95's and Win NT's Taskbar.



Warp 4's biggest technological innovation is its built-in voice recognition: You can speak into a microphone to navigate the OS/2 desktop, or even dictate documents into programs such as word processors, with surprisingly accurate results. Unlike Windows, Warp also has built-in Java, which lets you run Java applets without launching a Web browser.

OS/2 Warp 4 is an exciting upgrade for current fans of OS/2, but there's a flashing stoplight for Windows users: Although Warp runs DOS, Win 3.1, and native 32-bit OS/2 apps, it can't run 32-bit Win 95 or NT apps. For a full review of Warp 4, visit PC World Online (http://www.pcworld.com/warp).

OS/2 Warp 4

List price: $249, upgrade $149; IBM, 800/426-2255, http://www.software.ibm.com

bility of running each 16-bit app in its own address space, so one poorly behaved 16-bit program can't crash another.

None of this should suggest that Win 95 is a basically shaky OS. In research for this article, we spent hundreds of hours pounding on PCs, peripherals, and software and never had a crash with Win NT *or* Win 95—a far cry from the legendary unreliability of Win 3.1.

That doesn't mean NT's extra emphasis on stability isn't a big plus for many users, especially those who simply can't afford to risk damage to, say, a vital customer database. Think of it as the equivalent of automotive safety features such as antilock brakes and safety-cage construction. With or without them, chances are you'll never total your car—but it's good to know they're there just in case.

LOCK UP YOUR DATA

CORPORATE users are likely to want an OS that can protect sensitive data from prying eyes or accidental deletion, and here NT offers substantial advantages over Win 95. The latter's security looks good on the surface—it can be set up so that you must log in with a user name and password, and you can password-protect shared drives. But it's more bark than bite: Anyone who sits down at your PC can create a new account and password, or bypass security by pressing <Esc> at the log-in screen or booting in Safe mode.

Win NT's security is much more airtight—by default, only the system's administrator can create accounts, and you can't bypass security. Additionally, NT lets you specify who has access to disks, directories, and individual files, whether the users are sitting at the keyboard or logged in over the network. To get file-level security, you need to install NT using its NTFS file system, which provides much more security than Win 95's FAT, the aging file system that dates back to the dawn of MS-DOS. (Alternatively, you can install NT using FAT, which lets you place NT on a single drive partition along with DOS, Win 3.1, or Win 95.)

Unlike Windows 95, Win NT Workstation 4.0 also comes with tools that let anyone who's comfortable with the basics of World Wide Web authoring create an *intranet*—an internal corporate information system built around Internet software such as Web browsers and servers. It provides this capability through Peer Web Services, a suite of Web, FTP, and gopher servers. With these utilities, it's surprisingly quick and easy to configure a PC to deliver corporate data that networked users can view with any Web browser. (At press time, Microsoft had put a personal Web server for Windows 95 on its Web site at http://www.microsoft.com/ie/download/ieadd.thm; it's free but is not included with Win 95 itself.)

One little catch with NT's Peer Web Services: Your data is visible only to local network users, not the Internet at large. If you want to create a Web site that's available to the whole world, you have to use another Web server, such as Microsoft's free IIS server. You'll also have to upgrade to the much costlier Win NT Server 4.0, since Win NT Workstation's license limits you to ten users at any one time, including Web visitors.

PRODUCT COMPARISON

	FEATURES	Windows 95	Win NT Workstation 4.0
Standard	Street price	$180	$290
	Upgrade street price	$90	$135
	Recommended mininum processor	486DX	Pentium-60
	Recommended mininum RAM/disk space	8MB/40MB	16MB/120MB
	File systems supported	FAT, FAT32	FAT, NTFS
	Applications supported	MS-DOS, 16-bit Windows, 32-bit Windows	MS-DOS, 16-bit Windows, 32-bit Windows
	Supports Plug and Play	●	○
	Supports Advanced Power Management	●	○
Included utilities and applications	Disk compression	●	●[1]
	Web browser	○[2]	●
	Intranet Web server	○[2]	●
	E-mail	●	●
	Fax	●	○[2]
	Backup	●	●
	Peer-to-peer networking	●	●
	Server-based networking	○	●
	Dial-up remote access server	○	●
Service and support	Free support (days)/toll free	90/○	○[3]/○
	Weekend support	○	●
	Weekday support (hours)	12	24
	Fax/online support	●/●	●/●

● Yes ○ No

[1] Works only with NTFS and is not compatible with Win 95's DriveSpace.

[2] Free at Microsoft Web site. [3] Two free calls for setup assistance.

NT'S MISSING FEATURES

SO MUCH for major features unique to Windows NT. The bad news is that Windows NT lacks Windows 95's Plug and Play hardware installation. Plug and Play isn't perfect, but when it works, it can make upgrading or installing new hardware on your system a breeze. Win NT will probably find your hard disks, CD-ROM drives, SCSI devices, and mouse on its own, but that's it. Installing other devices, such as sound boards, happens much as it does under Win 3.1—you must locate a driver (from the Windows NT CD-ROM or the manufacturer's disk or online site) and install it yourself. You're also more likely to need to fiddle with IRQs, interrupts, and other unpleasant realities of hardware configuration, and that's assuming an NT driver exists at all—read on for what we discovered about driver availability.

Notebook users are worse off, because NT lacks Win 95's support for hot-swapping PC Card devices (part of Plug and Play) and Advanced Power Management. Some notebook manufacturers plan to write their own Win NT PC Card and APM extensions. But if your system's vendor isn't so enterprising, you may have to wait for Win NT 5.0 to get full-fledged support for portable computing. Until then, be prepared to reboot when you exchange PC Cards, and your battery life may be brief at best.

NO PERFECT WINDOWS

ULTIMATELY, NEITHER version of Windows has a clear advantage from a features standpoint. Too bad Microsoft hasn't come up with a version that offers everything: Win 95's Plug and Play and good support for mobile PCs, *and* NT's better security and stability. At least both versions finally sport the same interface, so ease of use isn't a factor when choosing between them. ▶

Compatibility: Win 95's Strength, Win NT's Weakness

WIN NT's lack of Plug and Play is only one issue that helps determine how easy—or hard—it is to get it running on a given PC. The bigger issue is whether the various items that make up your system will work with NT at all. To test compatibility, we devised four representative desktop systems, as well as a portable setup built around a notebook and PC Card peripherals (see "Accident Report," below). With just the essentials installed, we loaded the OS, then installed a suite of peripherals and programs one at a time.

Windows 95 worked with all these products much more smoothly than NT did—no big surprise there. Most new apps are designed for Win 95, and it runs the vast majority of old DOS and 16-bit Windows applications well. Finding Win 95 hardware drivers is rarely hard, and for the most part, its Plug and Play eases setup pains, although it still can't resolve every conflict.

Win NT is another story. It isn't based on the MS-DOS core code and uses a different driver architecture than Win 3.1 and 95, so the only way it will work with a particular piece of hardware is if someone has written a driver specifically for Windows NT. Consequently, a lot of hardware just isn't compatible. Seven of the 31 devices we tried failed to operate; the OS handled basic items like drives and video cards easily, but we often had trouble with other peripherals such as sound cards, tape drives, and scanners.

Before you even consider moving a PC to Windows NT, check Microsoft's guide to hardware it has successfully tested with NT (http://www.microsoft.com/isapi/hwtest/hsearchn4.idc). ▶

Accident Report

What Went Wrong With Windows NT

Most hardware and software we tested with Windows NT worked well, but we had big problems with some popular products. Here's the lowdown on the major snafus we encountered in our five test configurations and what—if anything—can be done. For full results of our Win 95 and Win NT compatibility tests, visit PC World Online at http://www.pcworld.com/winreview.

	Overall Compatibility	Product	What went wrong	Can anything be done about it?
Office system	fair	HP Colorado T1000E parallel port tape backup drive	Win NT didn't recognize the drive during installation.	HP has no plans for a Win NT version.
		Logitech PageScan Color	No Win NT driver available.	Logitech has no plans for an NT-compatible version.
		Lotus SmartSuite 96	Freelance Graphics wouldn't install; Approach intermittently froze up or displayed error messages.	SmartSuite 97, due in early 1997, will be designed to run with both Win 95 and Win NT.
		PKZip for Windows 2.01	16-bit app produced error messages when dealing with folders with long names.	32-bit Win 95 and Win NT version that handles long file names is due by end of 1996. Archrival WinZip is already available in 32-bit NT-compatible version.
Multimedia/game system	poor	Advanced Gravis Ultra Sound PnP sound card	No Win NT driver available.	Advanced Gravis is working on a Win NT driver.
		Doom (DOS version)	No sound from SoundBlaster card; game requires the SoundBlaster to use IRQ 2, 5, or 7, but Win NT lets the card use only IRQ 10.	Configure your PC to dual-boot between Win NT and DOS—an approach every game player should take when moving to NT.
		Softkey Compton's Interactive Encyclopedia	No text visible—displays empty boxes instead.	Softkey was surprised to hear of compatibility problems with Win NT and unable to provide a solution.
Graphics system	good	HP ScanJet 4P	No Win NT driver available.	HP plans to provide Win NT-compatible scanner drivers sometime in 1997.
		Iomega Zip drive	Win NT didn't recognize that we'd attached the drive to the system.	Drive worked properly when we installed it as a SCSI device using Win NT's Control Panel.
Communications system	fair	Symantec CommSuite 7.0 for Windows 95	This fax, terminal emulation, and Web browser bundle is not compatible with Win NT 4.0.	A Win NT version of the WinFax app is planned for early 1997. Microsoft includes a terminal program with NT and offers a free fax app on its Web site.
		Quarterdeck Procomm Plus 3.0	We got it to run only by disabling its error correction mode.	Quarterdeck plans to release Win NT-specific edition in February.
Mobile system	poor	PC Card devices in general	Win NT does not support hot swapping of cards; you must shut down the system before changing them.	Microsoft plans better PC Card support for Windows NT 5.0; third-party vendors are working on interim solutions.
		PC Card hard drives in general	Win NT may assign the PC Card drive as drive C:, causing a notebook's internal drive to become unavailable.	Microsoft's Web site explains how to reassign the drive letters (http://www.microsoft.com/kb/bussys/winnt/q153619.htm).
		Integral Viper 340 PC Card hard drive	Didn't work in our test notebook due to an incompatibility between Win NT and the notebook's Texas Instruments chip set.	Microsoft is attempting to resolve the problem.
		New Media .WAV Jammer PC card sound adapter	No Win NT driver available.	New Media is working on a Win NT driver.

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Most vendors we contacted with products not yet compatible with NT have NT drivers in development, but there are some prominent exceptions, including Logitech's PageScan Color scanner and Hewlett-Packard's T1000E tape drive.

THE SOFTWARE SITUATION

IN THE LONG RUN, virtually all new business-oriented Win 95 applications will likely also run under NT. Microsoft is phasing out the Designed for Windows 95 logo and replacing it with a Designed for Windows NT and Windows 95 one; products that bear the new logo will be guaranteed to work with both versions. (Most apps that have the Designed for Windows 95 logo are supposed to run under NT, but the rules are far from strict.)

Unfortunately, Microsoft doesn't maintain a list of software that has been found to operate properly with NT, as it does with hardware. Our tests show that most programs likely to fail are in distinct categories. Win 3.1 and Win 95 utilities will almost certainly give NT fits: Because NT uses different schemes for memory and disk access than Win 95 does, utilities must be designed with it in mind; NT versions of such major utilities as Symantec's Norton Utilities and McAfee's VirusScan are available. Communications programs, too, often fail under NT because they don't interact with your PC's hardware the way NT demands.

Games are another sticky area. DOS games usually achieve fast performance by writing directly to the PC's display and other hardware—a serious NT no-no—so you can forget about playing most of them with NT. Mech Warrior 2 stood a better chance of working, since it was designed for Win 95. It conked out in our tests, however, because it uses four of Microsoft's five DirectX add-ins; as we went to press, NT still supported only two of them.

What's the final word on Win NT's compatibility? An optimist would note that it worked with most of the products we tried; a pessimist would zero in on the well-known ones it couldn't handle. You'll need to examine your PC's configuration, check Microsoft's hardware compatibility list, and talk to your software's vendors before you'll have a feel for whether you're likely to have problems when running NT. ▶

TEST REPORT

Performance: A Few Big Differences

Some programs strongly favored one version of Windows, but overall scores were neck and neck.

HOW WE TEST Tests were conducted on an NEC PowerMate Pentium-100 with 16MB of RAM, a 1.2GB EIDE hard disk, and a Diamond Stealth 64 graphics board; on the same system with 32MB of RAM; and on a Micron ClientPro Pentium Pro-200 with 32MB of RAM, a 2.1GB Wide SCSI hard disk, and a Number Nine Imagine2 graphics board. All tests were performed by hand; timing stopped when we regained control of the cursor. **WORD 7.0:** We loaded a 5MB document; tasks included searching and replacing, printing, and saving. **EXCEL 7.0:** We loaded a 13.5MB spreadsheet; tasks included sorting, subtotaling, and saving. **1-2-3 release 5.01:** We loaded a 43MB spreadsheet; tasks included sorting, searching and replacing, and saving. **PARADOX 7:** Using a 47MB database, we performed tasks including querying 3 joined tables, adding an index, creating a report, and rebuilding. **FRAMEMAKER 5:** Tasks included flowing text, formatting, searching and replacing, and printing. **AUTOCAD release 13:** We loaded a 6MB data file; tasks included creating a 3-D polar array, rendering an image, and saving. **EXTREME 3D 1.0:** We imported a 2MB DXF file and performed tasks including rendering to screen, rendering to an AVI animation, and exporting.

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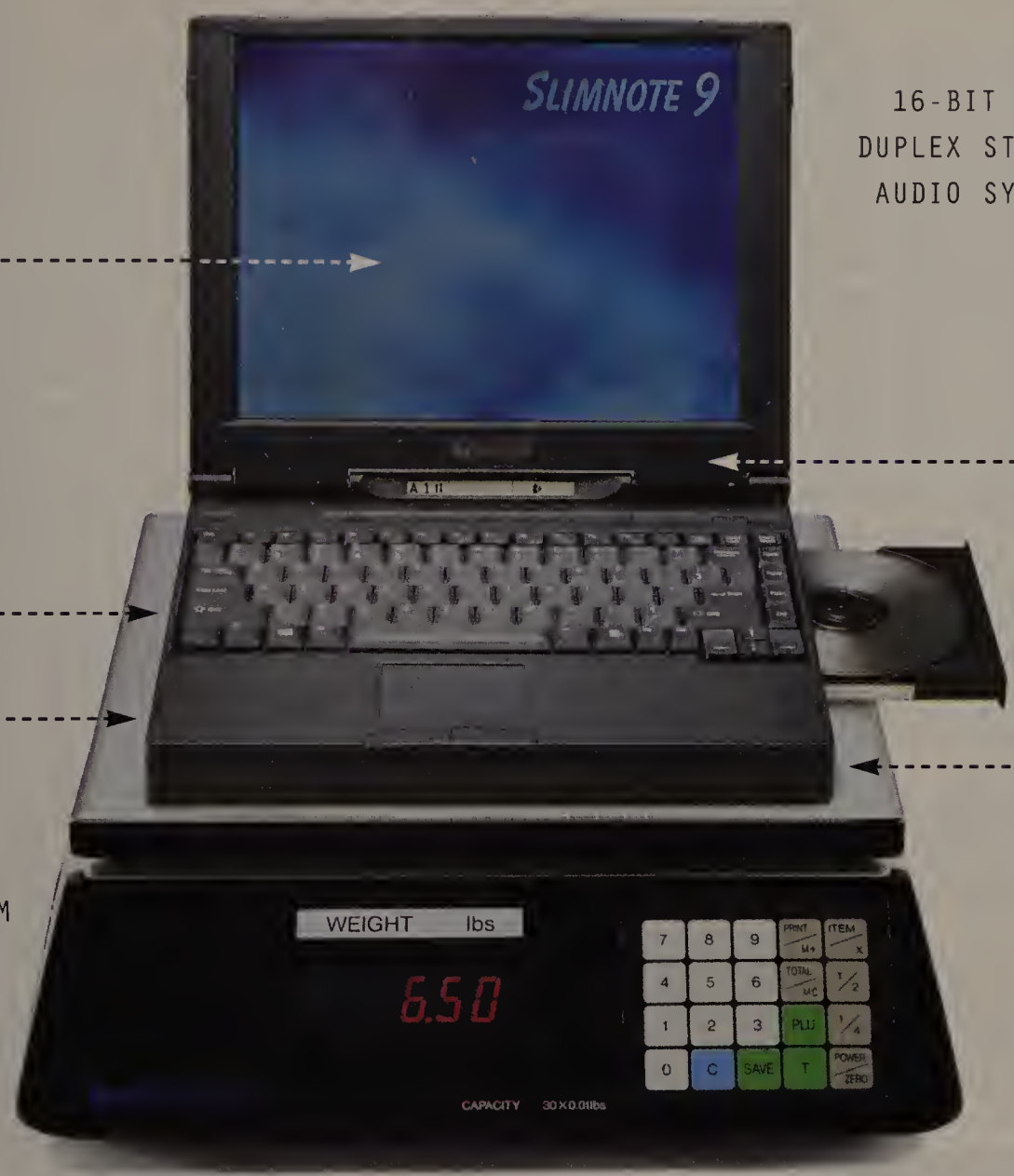

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Performance: No Overall Winner

When we set out to compare how quickly Win 95 and Win NT 4.0 perform the same tasks, we chose sensible real-world hardware configurations, rather than Microsoft's overly optimistic minimum requirements. We tested each OS on a Pentium-100 PC with 16MB of RAM, again on the same system with 32MB of RAM, and on a 200-MHz Pentium Pro PC with 32MB of RAM. We performed tasks using workaday business applications (Word, Excel, 1-2-3, and Paradox) and high-end apps (AutoCAD, FrameMaker, and Macromedia's Extreme 3D graphics package). To see how each OS dealt with demanding tasks, we used large files, such as a 13.5MB Excel spreadsheet and a 6MB AutoCAD design file.

Neither version of Windows emerged as the clear performance champ. Each ran certain applications much faster than the other. Excel, for instance, ran up to 58 percent quicker with Win 95 than with Win NT, and FrameMaker was always at least *twice* as fast under NT than under Win 95, regardless of system configuration. But in many cases the difference for a particular app was around 15 percent or less—virtually unnoticeable in everyday use.

NT's pure 32-bit architecture helps with demanding multitasking applications.

And the total time it took for the two Windows to finish all the tests was remarkably similar on a given hardware configuration.

Conventional wisdom says Win NT demands a more potent PC than Win 95 for decent performance. In testing both versions on a Pentium-100 PC with 16MB of RAM, we found this rule may be outdated. Word, Excel, 1-2-3, and Paradox were faster with Win 95 than with NT, but only by 3 percent to 16 percent. With AutoCAD and Extreme 3D, NT actually squeaked past Win 95; with FrameMaker it eclipsed Win 95 by a whopping 126 percent.

Bumping the PC up to 32MB of RAM affected results in different ways, depending on the program. In the case of Excel and AutoCAD, Win 95 benefited more from the additional RAM than NT did. On the 32MB machine, Excel was about a third faster under Win 95 than NT, and AutoCAD about 21 percent faster; Word ran about a third faster under NT than under Win 95 in this setup. NT's edge with FrameMaker got even more lopsided.

If you're struck by how much faster both Win 95 and NT finished our tests with 32MB of RAM than with 16MB, bear in mind that we used large files that tended to force the 16MB system to juggle data to the hard disk. The most startling example: With Win 95, sorting the 13.5MB spreadsheet—one of the tasks we did with Excel—took an hour and 21 minutes with 16MB of RAM, while the same sort with 32MB of RAM took just 39 *seconds.* If you work with smaller files, you'll probably see a much smaller speed gain with 32MB of RAM than we found here.

Conventional wisdom also says that NT is the logical version of Windows to run on a Pentium Pro PC, since that CPU favors purely 32-bit code (like NT's) to Win 95's mix of 16- and 32-bit architecture. But on our Pentium Pro-200 system with 32MB of RAM, Win 95 outperformed NT with Excel (58 percent faster under Win 95), Paradox (17 percent faster), and AutoCAD (29 percent faster). NT won out with Word (14 percent faster) and once again blazed through the FrameMaker tests. The other apps ran at about the same speed on both operating systems.

These results refer to NT with the FAT file system. We also tested NT with its NTFS file system, which lets it protect data file by file. This scheme exacts a price in performance: Win NT with NTFS was the slowest OS overall on all three PC configurations we tested, and in most cases was the slowest for each individual program. The difference in speed compared to NT with FAT usually wasn't huge—often a negligible 1 or 2 percentage points, and rarely more than 15 percent. The big exception was Word, which was always at least 72 percent slower with NTFS than with FAT.

AN ADVANTAGE IN MULTITASKING

Power users should note that NT's pure 32-bit design gives it an advantage in high-intensity multitasking. When we tried simple multitasking of several apps at once, neither version of Windows was clearly superior. But then we tried to push both operating systems to their limit with as many calculation-intensive tasks at once as possible, including a database query in Paradox, a large worksheet sort in 1-2-3, and a 3-D scene rendering in AutoCAD. With Win 95, our PC quickly became so preoccupied with the background jobs that just navigating around the desktop with the mouse pointer became very sluggish. With NT, however, the desktop remained snappy despite the background tasks.

All in all, we can only conclude that neither OS has a meaningful natural performance edge on any of the PC setups we tested—it all depends on the specific apps you use. We mentioned all the major speed differences above, and you should consider them if you spend most of your workday in one of the affected apps. If you divide your day between a variety of programs, though, one might run a bit slowly under the version of Windows you use, but another will probably be brisk enough to compensate. Unless you perform heavy-duty multitasking, we don't think you're likely to see an *overall* difference in performance between the two operating systems on a reasonably well equipped PC.

For more Windows tips and news, join PC World *editors on our message board at http://www.pcworld.com/win_talk/. Scott Spanbauer is a* PC World *contributing editor. Testing performed by Ulrike Diehlmann, Jeffrey Kuta, Kevin Mitchell, Mike Salayko, and Susan Silvius.* ■

Where to Buy

Windows 95
Street price: $180, upgrade $90
READER SERVICE NO. 786

Windows NT Workstation 4.0
Street price: $290, upgrade $135 (NT users only)
READER SERVICE NO. 787

Microsoft Corp., 800/426-9400, http://www.microsoft.com

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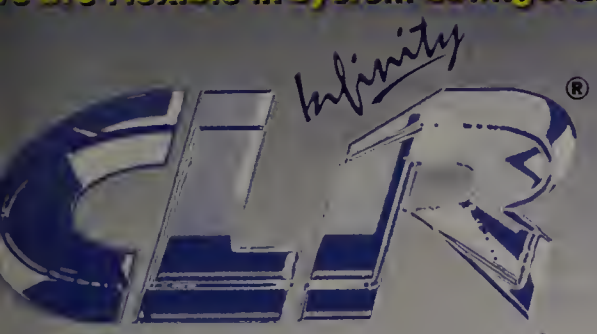

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best ways to manage your mOney

How to get a grip on your finances: Top tips, products, and Web sites.

BY ERIC TYSON

136 Getting Organized

137 Paying Bills

140 Expense Tracking and Budgeting

142 Taming Taxes

144 Investing

150 Retirement Planning

LYNN BRENTON USES QUICKEN to handle her personal finances, and overall she's very happy with the program. But the Decatur, Georgia–based computer specialist for a lighting fixture manufacturer knows the program's weaknesses: "I can't figure out how to budget with Quicken, so I still use Excel for that."

Handling your personal finances can be a daunting task, one that seems made to order for a personal computer. After all, your PC can track when bills need to be paid and even pay them via modem, track expenses and help you create a budget, and ease all the painful parts about pay-

ILLUSTRATIONS BY GERARD DUBOIS

ing taxes except, of course, actually paying them. Online services and special software can help you make and track investments, and plan for that ultimate vacation—your retirement.

But a PC won't solve your money problems, and may even cause a few new ones. Finance programs aren't as easy to use as their vendors want you to believe, especially if you know little about financial basics. If you fall months behind in tracking your spending, you'll get nothing out of it but guilt; on the other hand, tracking every penny can become time-wasting and unproductive, especially if you don't make wise use of your newly acquired information.

MICHAEL DOUGHERTY USES QUICKEN to fine-tune his finances and run Kindermusik, a small business that helps kids find music tutors.

In the following pages, I'll show you the best strategies for managing your money on your PC. You'll learn about the hidden features and pitfalls of the popular programs, how to find where your money is going, and which investment sites on the World Wide Web are the best. You paid a lot for your computer, and it's time you made it pay off.

GETTING ORGANIZED

BEFORE YOU CAN USE YOUR COMPUTER to get a handle on your finances, you need to start using it to record your assets, liabilities, and transactions.

Get a checkbook program. The best tools for this job are checkbook programs like Quicken, Microsoft Money, and Managing Your Money. (Disclosure: I was one of several experts paid by Intuit to write online financial advice for the 1996 Quicken Deluxe CD-ROM.) These programs go beyond managing checking accounts and try to be sophisticated electronic financial advisers. They don't always succeed. Elizabeth Nesbitt of Fort Wayne, Indiana, a mostly satisfied Quicken user since 1990, finds that in some respects, Quicken is "not sophisticated at all. For instance, it can't compare 15-year with 30-year mortgages." (See the sidebar "Quicken or Money?")

Set it up. When you first use a checkbook program, it walks you through the task of setting up your "accounts." Set up one for important bank accounts, credit cards, loans, and investments. The program will ask you a lot of questions, so have your bank statements, credit card bills, and other financial papers handy before you start.

Save your receipts. Set aside time every month to enter all your transactions—checks you've written, checks you've deposited, ATM withdrawals, credit card charges, and so on—into your checkbook program (see the tip "Entering your Paycheck" for details on handling this important transaction). Be extra diligent about credit card transactions; they can get out of hand.

Create logical categories. As you enter transactions, you'll be asked to assign each one to a category, such as Groceries, Entertainment, or Household. Later, you'll be able to see how much you've spent in each cate-

Tips for Getting Organized

Splitting Transactions

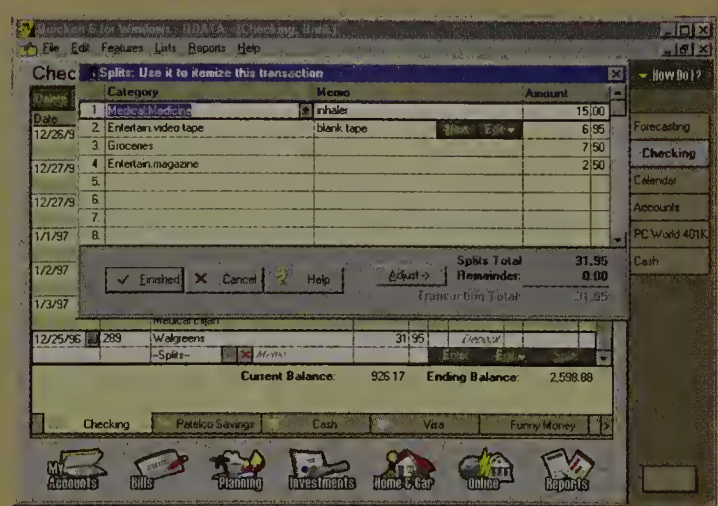
A CHECK TO THE SUPERMARKET can easily be categorized as Groceries, and a charge at the gas station as Car:Fuel. But under what category do you place a single charge at the drugstore for a magazine and prescription medicine? You split it between two categories.

In either Quicken or Money, when you get to the Category field, click the *Splits* button. Enter the categories and amounts in the resulting dialog box.

Entering Your Paycheck

YOUR CHECKBOOK program needs more information about your paycheck than how much money you've deposited—at least if it's going to give you accurate information down the line. You have to tell it what has been deducted, as well.

In Quicken, enter the paycheck as a split transaction as described in "Splitting Transactions." In the first split line, enter the gross pay, and in the lines that follow, enter the deductions (taxes, 401(k), and so forth), making sure to use negative amounts.



IF A PURCHASE IS FOR ITEMS in more than one category, use Quicken's (or Money's) Split feature.

Money gives you a niftier way to handle this. Click the *Go To* button, select *Payment Calendar*, then click the *New* button. In the resulting wizard, select the Deposit option and click Next. In the category field, type **paycheck**. Money's Paycheck Wizard holds your hand through the process of entering the information and asks you whether you want to track 401(k) or other pretax or posttax deductions. If you say you do, it sets up a retirement account to receive those deductions if one is not set up already.

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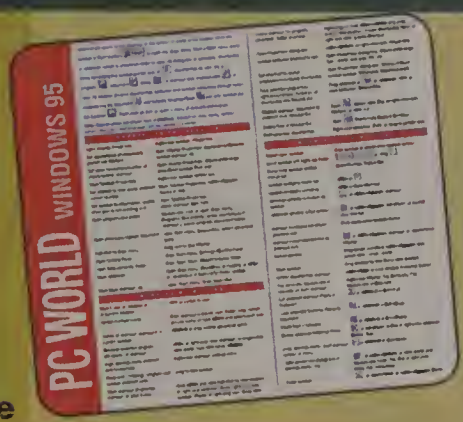

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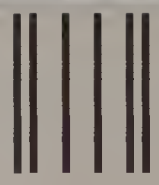

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gory, helping you determine where your money's going and what you can trim. Categories can have subcategories; for example, you can set up Auto:Fuel and Auto:Service, letting you see how much you're spending on your car and exactly where that money is going.

How detailed should you be with the categories? As much as necessary. If you suspect that an inordinate amount of your grocery bill is going to ice cream, you may want to create a Groceries:Ice Cream subcategory. But Groceries:Ice Cream:SuperUltraChunk is a bit extreme. And if you're happy with your expenditures, there's no need to record extra details.

Balance your accounts. If you want to keep a tight watch on your checking account, compare your monthly bank statement to your data to see if there are any errors or unforeseen charges. In Money, check the *Balance* button on the right of the account registry screen; the program will explain what to do. In Quicken, click the *Reconcile* button near the top of the registry screen.

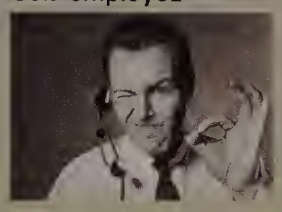
Consider doing your banking online. Balancing your account is a lot easier if your software can call your bank via modem. If your bank offers online banking, you can get up-to-date account information into your computer at any time of day or night. You can also transfer money from one account to another. Unfortunately, you can't bank online unless your institution offers the service.

The best situation is when your bank's online service is compatible with your particular checkbook program. If your bank doesn't support your program, or worse yet, doesn't have online banking at all, there's not much you can do except struggle along, wait for things to improve (they probably will as standards develop), or change banks.

Is This You?

Scenarios for Financial Well-Being

WHAT ARE THE BEST financial tools and strategies for you? That depends. Are you just starting out after college? Are you trying to put four children through law school? Are you Bill Gates? Find the scenario below that best matches your conditions and needs.

Scenario	Recommended Software	Advice
Starting out	The basics: Checkbook program, retirement planning software.	If your employer has a retirement savings plan, put as much of your long-term investment there as possible.
Married with children	The basics, plus tax software and Nolo Press's WillMaker.	Develop joint savings and retirement plans with your spouse; use your checkbook program to work out a budget.
Self-employed 	The basics, plus tax software and investment research tools.	Establish your own retirement savings plan, such as a SEP-IRA or Keogh, in which you choose your own investments.
Divorcing	The basics, plus tax software and Nolo Press's *How To Do Your Own Divorce.*	Reevaluate your new spending needs and constraints; redo your retirement plan and reconsider your insurance needs.
Retiring	The basics, plus Vanguard Retirement Manager.	Learn all you can about investing, go online to exchange e-mail with your computer-literate children and grandchildren.

PAYING BILLS

ONCE YOU'VE GOT A SYSTEM in place, paying your bills is a lot easier. You'll still have to use your own money, but you won't have to write all those checks, address all those envelopes, or lick all those stamps. The fact is that paying bills the traditional way costs you time and money. The alternatives also cost time and money, but if you do it right the return is greater.

Always pay your bills on time. Paying a bill late can result in interest charges, late fees, and even stopped services, but paying big bills early has its own punishment—lost interest. That's why checkbook programs have a bill reminder: Simply set it up to remind you five days before a major bill is due, and your check should arrive just in time to avoid late fees.

But how should you actually pay your bills?

If you have a lot of bills, pay online. Rather than write a check to, say, pay your mortgage, you can tell an online service to subtract the amount from your checking account and wire the funds to the mortgage company. It's fast, convenient (no more stamp licking), and at a service fee of about $6 a month, cheaper than using checks if you write more than 15 of them a month. Unlike online banking, you can pay bills online through your checkbook program even if your bank doesn't offer online anything.

Online bill-paying is "the fastest, cheapest way to disperse funds," says Michael Dougherty of Danville, California. He pays his bank $5 a month to handle both personal expenses and

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those of his business Kindermusik, which brings together children and music teachers. Because, as Dougherty says, Kindermusik is a "virtual company," he can get by without a business accounting program. He uses software geared to his type of company to run the business and track income, and Quicken to pay bills. "The receivable functions in Quicken are limited, but I find it quite good for the payable end," he says.

Find other ways. Justin Wells, a research assistant living in San Francisco, finds online bill payment too expensive in his situation. "There are cheaper ways to pay my bills," he notes. For no extra charge, his bank lets him pay his utility bills via a Touch-Tone phone, and his student loan and insurance payments are paid by automatic withdrawal. After that, he has to write and mail only one check per month—to his landlady. "The online bill payment services don't seem to realize that the Post Office is not their only competition," Wells says.

EXPENSE TRACKING AND BUDGETING

NOW THAT YOU'VE LEARNED THE ART of spending money, you have to master the skill of spending less of it—a much harder job. Should everyone analyze their expenses and draw up a budget? No. If you're meeting your savings goal (for most people, 10 percent of your gross income is a good target), don't worry. But if you can't manage to put anything away, or if you're going through a major life change—such as having children, starting a business, or getting a divorce—budgeting is a good idea. If you're entering your check and credit card expenses into a checkbook program, using categories that make sense to you, you're already halfway there. Follow these additional steps to wiser spending.

Note the details. Now would be a good time to add some subcategories to your checkbook program, and also to start tracking where your cash is going once it leaves the ATM. Knowing that you withdrew $900 last month is not nearly as enlightening as knowing that $200 of that went to lattés, $300 to lunches out, and $400 to gambling. If you're ▶

Tips for Budgeting

Easy Quicken Worksheets

TO BE EFFECTIVE, a budget must remain relatively simple and flexible. But when you open up Quicken's Budget window (*Features•Planning•Budgets*), you're presented with an intimidating list of categories. Odds are you'll only use some of them in your budget. Here's how to bring the categories you need to the top of the list:

From Quicken's Budget window, click *Edit* and select *Supercategories*. Assign categories on the left-hand side of the dialog box to supercategories on the right-hand side. You should assign to a supercategory only those categories you wish to include in your budget.

After you've closed the dialog box, click *View•Supercategories* in the Budget window to move the categories in the supercategories to the top of the list.

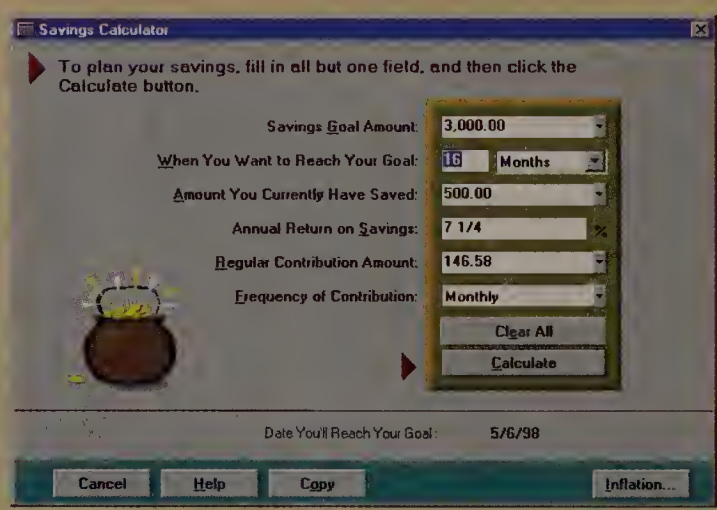
Budgeting a Mortgage in Quicken

ONE IMPORTANT MONTHLY BILL, your mortgage, won't show up clearly in Quicken. That's because Quicken treats part of that payment as an interest charge, in a category labeled Int. Exp., and part of it as a transfer from one account (checking) to another (your mortgage liability). Worse yet, the transfer isn't considered an expense, even if you're writing a check for it.

To include account transfers on your budget worksheet, click *View•Transfers* in the Budget window.

Watch Your Budget

IF YOU TEND TO EXCEED your budget in two or three particular spending categories, single them out and watch them carefully.



MICROSOFT MONEY'S SAVINGS CALCULATOR helps you set up savings goals and tells you when you'll reach them.

In Quicken 6.0, select *Features•Planning•Progress Bar*. Click the *Cust* icon on the Progress Bar and choose a budgeting category (such as *Dining*) to track. A fuel-gauge chart at the bottom of the screen shows you how much of your budget you've used.

The process is a bit slower and clumsier in Microsoft Money 5.0. Click *Go To* and select *Report and Chart Gallery*. In the *Spending Habits* section, double-click *How I'm Doing on My Budget*. At the bottom of the resulting chart, click *Customize*, then *More Options*. In the next dialog box, retitle your report. Uncheck *Show empty categories*. For the Dates, select *Current Month*.

Near the bottom of the dialog box, click *Select transactions*. Click the *Categories* tab, click *Selected categories*, and select the category you want to track. Click *OK*, then *View*. Click *Add to Favorites* to make the new report easily accessible.

Keep Savings Goals

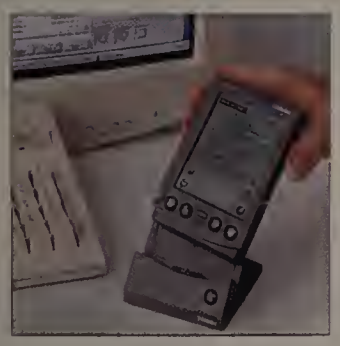
SAVING UP FOR A STEREO SYSTEM or a sunny vacation? Quicken 6.0 lets you set up a "phantom" account within an existing real one for tucking money away toward your goal.

Select *Features•Planning•Savings Goals*. Click *New* and fill in the resulting dialog box. The program calculates how much you'll need to save each month to achieve your goal. When your paycheck comes in, go to the *Savings Goals* window, click *Contribute*, and fill in the resulting dialog box. Quicken then subtracts the recommended amount from the running balance of your checking account (even though, in reality, the money is still in the account). You can set up one of Quicken's progress bars to follow this account, then watch the needle inch its way toward that sunny beach in Mexico.

To see how much money is *really* in your checking account, click *View* above your register and choose *Hide Savings Goals*.

Money doesn't offer this feature, but its savings calculator can help you meet a goal. Click *Go To*, select *Planning Wizards*, then click *Savings Calculator*.

Think of it as the most important part of your PC, to go.



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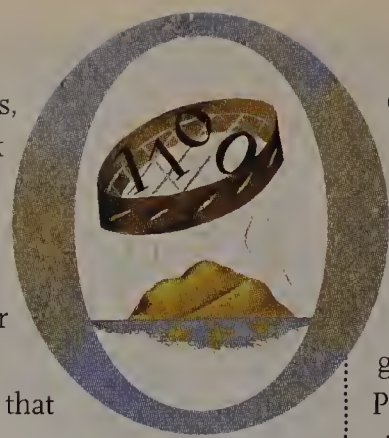
having trouble living within your means, you may find it very worthwhile to track and detail your cash spending for a few months. Set up an account called "cash" in your checkbook program, and treat each cash withdrawal as a transfer to that account.



Create a budget. Once you're satisfied that you have accurate and meaningful data on your spending habits, you can create a budget that will help you put more money aside. Be honest with yourself about your priorities. Start by cutting the categories where you get the least value for your money, and don't be afraid to spend money where it will help you save in the long run. For example, a good smoking-cessation program could save you thousands of dollars on cigarettes and health care over time.

Some people find the checkbook programs' budget-making tools intimidating, and with good reason. These worksheets can often clutter your computer screen with lots of expense categories that you may not want or need for your purposes. You might want to start out by creating your budget on a blank sheet of paper or in a spreadsheet program. Later you can transfer your figures to your checkbook program in order to take advantage of its useful reporting capabilities.

Don't get compulsive. Stop tracking pennies as soon as you're happy with your savings. Expense tracking is a means, not an end in itself. "When I started using Quicken," recalls Wells, "I would save and plug in every receipt from every cash transaction... I spent so much time keeping up that I kept putting off more important financial tasks."

TAMING TAXES

NO MATTER HOW GOOD A JOB you do trimming your budget, there's one expense you can't avoid: taxes. Fortunately, your PC can help here, too, thanks to your checkbook program, specialized tax software, and the online world. In fact, if you've used a checkbook program diligently throughout the year, you've got a good start on having a record of your expenses, and that's a big help in getting your taxes in order.

The simple solution. If you don't own property, have no business expenses, and aren't itemizing, don't sweat it. With your checkbook program on screen for easy reference, fill out some forms and be done with it.

The thorough solution. But if your financial life is a bit more complicated, do yourself a favor and buy a specialized tax program like TurboTax or Kiplinger's TaxCut. Programs such as these use a straightforward yet sophisticated interviewing process that helps you complete your tax forms correctly, highlights any deductions you might have missed, and warns you of items on your return that might attract an audit. And yes, these tax programs allow you to import financial data from the major checkbook programs (For example, TurboTax is an Intuit program and, not surprisingly, imports data quite easily from Quicken).

When you first use such a ▶

Tips for Taming Taxes

Answering Tax Questions in Quicken

QUICKEN 6.0, while far from a full tax program, can help you see how different scenarios (for instance, married and filing jointly or married and filing separately) will affect your bottom line. Select *Features•Taxes•Tax Planner* and start playing with the numbers.

Don't Throw Away Last Year's Data

IF YOU'RE USING the same tax program this year as last, you can hit the ground running by bringing last year's information into this year's version of the software. Check your documentation to see how to do this with your program.

Jump Around the Interview

TIRED OF PLODDING THROUGH your tax program's interview process? You don't have to complete the interview exactly as the software program presents it.

In TurboTax's *Interview* tab, after you've clicked the *Start Interview* button, click the *Interview Navigator* button, then the *Topics* tab. Scroll through a list of the Interview sections, see what you've done and what you've still to do, and jump to whatever section you want.

In TaxCut's Q&A, click the 'Topic' heading and select any topic from the resulting drop-down menu.

Adjust Your W-4

IF YOUR FINANCIAL or family status changes during the year, you may need to change the tax amount withheld from your paycheck. Luckily, your tax software includes a W-4 worksheet for this purpose.

In TurboTax's *Interview* tab, click the *Interview Navigator* button, then click the *Topics* tab, and choose *Withholding* (under 'Planning for 1997'). TurboTax will lead you through the form and figure out how many personal allowances you should claim.

To get to the W-4 form in TaxCut, click the *Forms* tab. In the Select a Form box, scroll to the bottom and double-click *W-4 worksheet*.

If you don't have a tax program, you can easily acquire a W-4 form at the IRS's Digital Daily Web site (http://www.irs.ustreas.gov/prod/forms_pubs/forms.html).

DON'T START FROM SCRATCH for this year's taxes. Intuit's TurboTax lets you import last year's information.

Go Online With the IRS

The IRS has some wonderful stuff online. Check out the Digital Daily (http://www.irs.ustreas.gov/prod/cover.html) for fun graphics, good information, and all the IRS forms you can download. If you're a true tax junkie, you'll love the Online Tax Code (http://www.fourmilab.ch/ustax/ustax.html), which lets you browse the complete text of the U.S. Internal Revenue Code.

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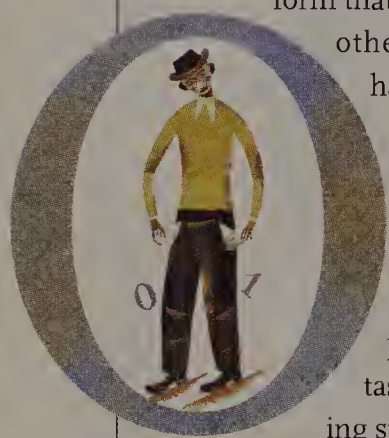
program, you should anticipate a time-consuming interview. "The first year took lots of time to key in all the information. I had to set up my account numbers and bank statements and stuff like that," says Les James, a Washington, D.C.–based engineer for the federal government. "But when the following year came, it asked if I wanted to import that information." Doing state taxes proved easy the first time around: "You just import your federal taxes, and you're done."

Once you've got your tax forms prepared, you can use the software to print out the forms for easy mailing, or you can file electronically. But filing taxes online isn't like paying bills that way. You have to navigate several layers of buttons in your tax software program, pay a hefty charge ($19.95 with TurboTax), fill out a form that you wouldn't have to otherwise, and you *still* have to lick a stamp. Dealing with the IRS is never easy, is it? The only advantage is that you get your refund check (if you're due one) three to six weeks sooner. Unless you're expecting a big refund, it's not worth it.



Besides getting you through April 15th, tax programs can help you year-round with such tasks as adjusting your withholding and making sure the tax you're paying is on track.

Should you use a tax advisor? Yes, in specific circumstances. Use one if your situation is particularly complicated—for instance, if you're buying or selling a business. If you're simply not comfortable with the results you received from the program or are not able to interpret them, paying someone to look over your returns can give you some peace of mind.

INVESTING

ONCE YOU'RE STICKING to a budget and have your taxes under control, what are you going to do with all that extra money? You could produce a low-budget feature film, but there are surer and steadier routes to building wealth. Your computer and modem can help you sift through tons of data and information, place trades, and track your investments. There are three basic steps to smart investing: Gather the information you need to make a wise decision, invest your money, and keep track of how your investments are doing.

Online treasure. There are plenty of sites on the World Wide Web and online service forums where you can research stocks and funds at little or no expense. For instance, the Securities and Exchange Commission's Web site (http://www.sec.gov) contains free information on every publicly held company and mutual fund in the United States.

Mutual funds or stocks? Once you've gotten up to speed, that's the first question you have to ask yourself. Unless you're willing to take on a new, time-intensive hobby, you're better off buying mutual funds and leaving the difficult decisions to the pros.

TRADE-OFFS: JOSHUA FAIRBANKS tried using an online investment firm, but grew frustrated when his electronic broker failed to respond.

Fund finders. For most people, the online sites listed in "Investing by Modem" are adequate for researching funds. But if you're really serious about finding the right mutual funds, consider Morningstar's Principia Plus. This excellent program lets you plug in a description of what you're looking for (low operating expenses and above-average long-term performance, say); then it provides a list of appropriate funds, complete with a wealth of background data. But Principia is an investment in itself, costing a steep $795 a year, $495 a quarter, or $295 a month. What's more, the program lacks an adequate explanation of fund and investing basics: You'll probably want ▶

Quicken or Money?

WE SAW MAJOR UPGRADES last fall to both leading checkbook programs. How do Quicken 6.0 and Microsoft Money 5.0 stack up? Both are excellent 32-bit programs that are easy to set up and use, with online links and lots of help. Here's a quick rundown. (For more details, see "Money and Quicken Face Off Again," December.)

Ease of use. Both are excellent. Quicken's QuickTabs and Activity Bar make navigation simple. Money's Contents button gives you quick access to other areas of the program.

Checkbook registers. Money has the edge here, with a nicely designed screen displaying the current transaction and the last 21. But Quicken's familiar layout is still easy.

Web links. Money offers one-button access to the Microsoft Money Zone; Quicken takes you to Excite's Best of the Web page.

Online banking. Both programs give you choices for bill paying and let you easily download your latest transactions.

Planning for the future. Both programs have retirement planners, long-term goal planners, and loan wizards to help you figure out what you're getting into. Quicken's debt reduction planner will guide you through the process of paying off all your debts.

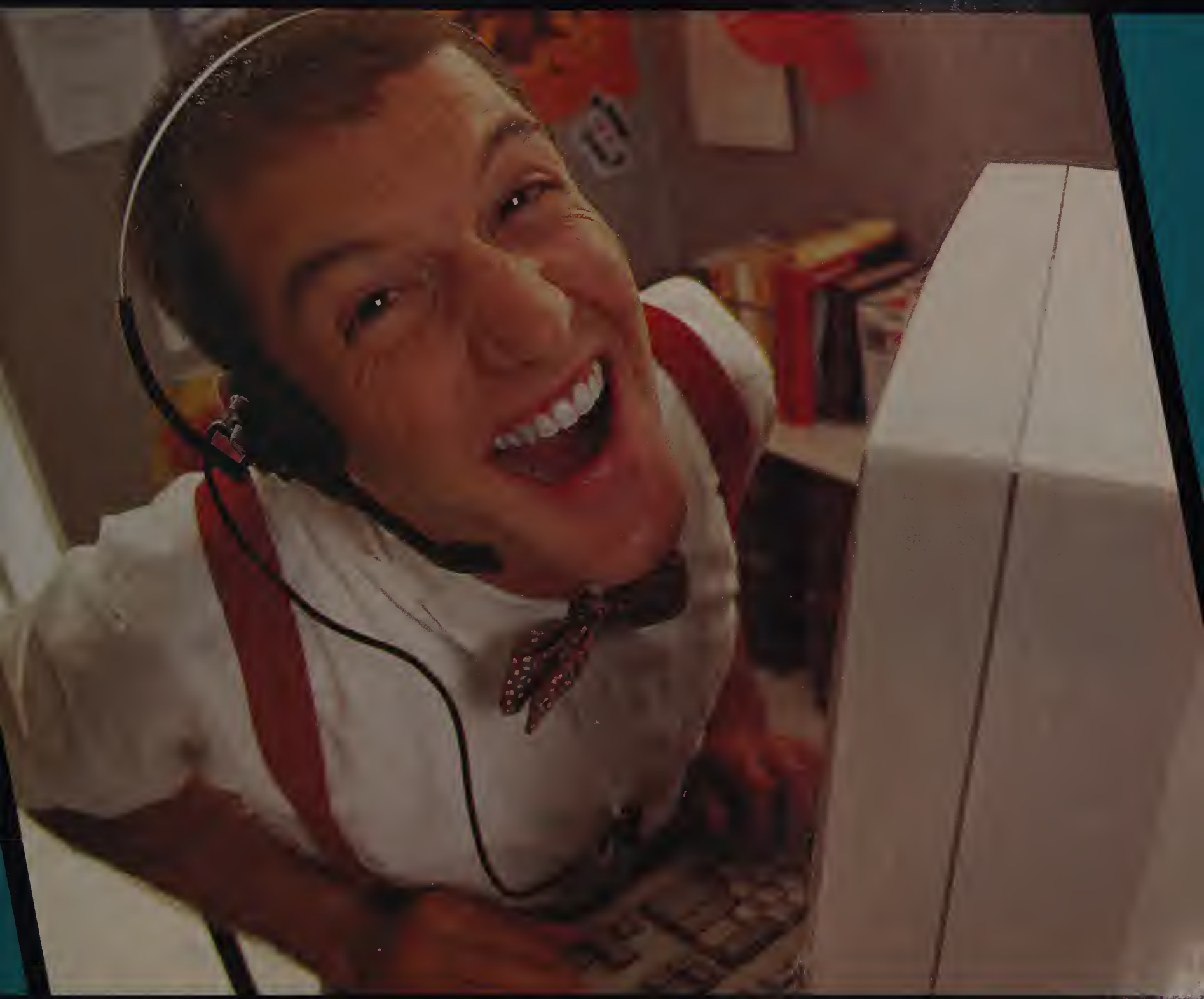
You can check out demos at the company's Web sites (http://www.intuit.com and http://www.microsoft.com/moneyzone).

—*Theresa W. Carey*

Theresa W. Carey is the founder of Alta Business Solutions and frequently writes about financial management software.

PHOTOGRAPH: RICH FRISHMAN

If you're more likely to purchase 5 computers than 500, here's *their* idea of a dedicated account team...



Meet Dougie. He's your customer service representative. And he's also a customer service representative for about 200 other customers every single day. Of course, you may have to wait about 30 minutes to talk to him because he's, like, busy, you know? Good news: Dougie's about as friendly as a cocker spaniel. Bad news: Dougie's about as bright as a pimento loaf.

Austin Edge Duet

- 133MHz Pentium® Processor
- 10X CD-ROM
- 16MB RAM
- 1GB Hard Drive
- Internal 33.6 Modem
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- Unique docking station design (gives you more features than most desktops)
- Uniquely Designed for Windows NT®*

Lease price available as low as **$154** per month

Austin Edge CD

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- NOW with 12.1" TFT Screen
- Uniquely Designed for Windows NT*

Lease price available as low as **$133** per month

***Austin Edge Products are designed especially for use with Windows NT, providing "Hot Swap" support for PCMCIA cards and enhanced power management. Features not available on most other notebooks. Austin ... providing the EDGE in notebook technology.**

And here's *ours.*

You Deserve Austin's Total Team Approach and Guaranteed 2-Minute Response Time.

Just about everybody knows that some of the best technology in the world comes out of Austin. Austin Computer Systems, that is. For 14 years, serious technologists have relied on Austin Computer Systems, a wholly owned subsidiary of globally diversified IPC Corporation, Ltd., for the richest, most up-to-date configurations—all at very reasonable prices. And, along the way, our products—including high-performance desktops, notebooks, and servers—have earned high praise and numerous industry awards.

But behind the products are some pretty wonderful people. A company full of overachievers. And if you're purchasing for a small or mid-size business, we at Austin Computer Systems are the only company that's truly configured for you.

Feeling Underserved? There's a Reason.

When you think about it, multibillion-dollar companies don't have a tremendous economic incentive to give your account the attention it deserves. They're more focused on the big fish and making those quarterly earnings statements as positive as possible. But, if you're willing to be very patient and are so loyal to a brand that you're content to be ignored, they'll probably get around to you. With somebody like Dougie.

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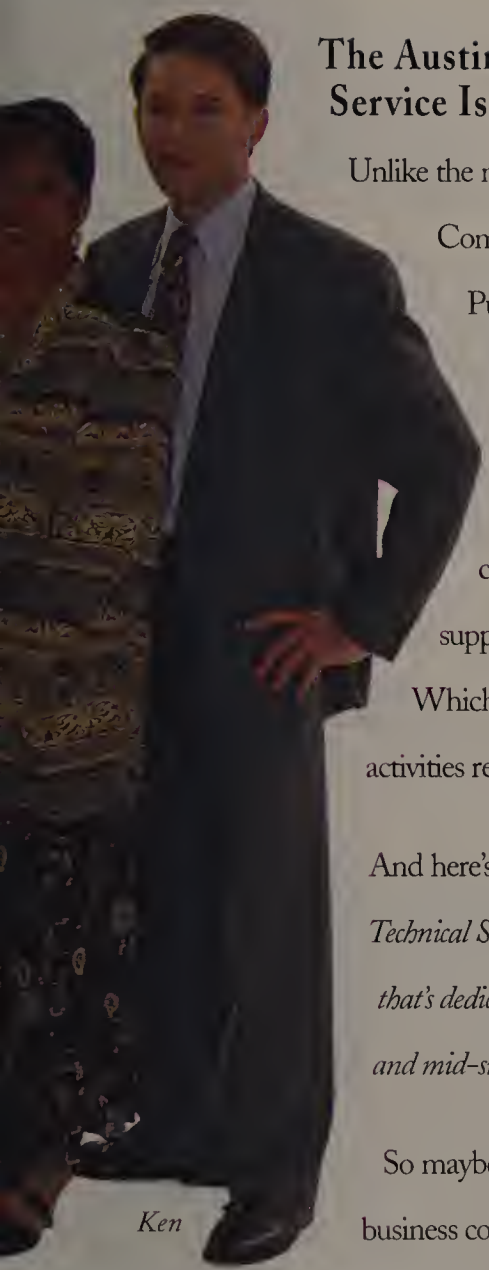
All rights reserved. Intel, the Intel Inside Pentium Processor logo, and Pentium are registered trademarks of Intel Corporation. Windows NT is a registered trademark of Microsoft in the U.S. and other countries. All other company names and products are the trademarks or registered trademarks of their respective owners. The above are special promotional prices. Prices and specifications are subject to change without notice. Special offers are good for a limited time only. Call for specific details. Actual configuration shipped may vary from products shown. Screens simulated for advertising purposes. We are not responsible for errors in typography or photography. Lease payments based on a 36-month contract period. Leasing arranged for Austin Computer Systems by Marketplacement, Inc.



The Austin Difference: Customer Service Is a Team Thing.

Unlike the multibillion-dollar computer giants, we at Austin Computer Systems simply can't afford to ignore you. Putting it directly, your business is a big deal here. That's why your purchase gets the immediate attention of a highly experienced, multidisciplinary team. Each team features professionals from customer service, sales, accounting, and technical support who all office within feet of each other. Which means that communication and coordination of activities related to your account couldn't be any easier.

And here's what it adds up to: *A Guaranteed 2-Minute Technical Support Response Time. And a true team approach that's dedicated to creating turnkey business solutions for small and mid-size businesses like yours.*

So maybe it's time you stop discussing your sophisticated business computing requirements with the Dougies of the world and move your business to Austin. Check out our Austin PowerPLUS, Austin Élan Workstation, and Edge notebooks.

Then, call your team at **1-800-331-1501.**

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Austin PowerPLUS

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- 12X CD-ROM

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†Upgrade far $429

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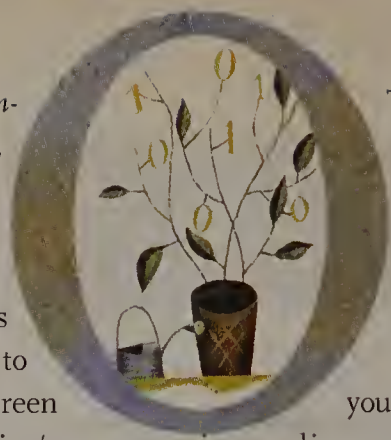
pentium PROCESSOR

to read a book on the subject first. Consider *A Random Walk Down Wall Street* (W. W. Norton & Co., 800/223-4830, 1996), by Burton Malkiel.

Taking stock. If you plan to play with individual stocks, check out the Value Line Investment Survey for Windows, where you'll get on-screen access to over 1700 stocks. With an interface similar to Morningstar's Principia's, the program lets you screen for stocks that meet certain criteria, such as low price/earnings ratios and high dividend growth.



If you have a large portfolio to manage or like to do extensive news searches, you might consider paying for a first-class, high-price online eye. EyeQ (http://www.datatimes.com) searches hundreds of publications to find articles on your desired topics, but the basic cost is $39 a month (that's $468 a year), and there are additional charges each time you actually use the service. Dow Jones News Retrieval–Private Investor Edition (800/369-7466) offers more regional newspapers than EyeQ, as well as wire services and its own publications. If you're willing to do all your online research on evenings and weekends, you can get 10 hours of Dow Jones per month for a flat $30; otherwise, you pay by the page, report article, or quote.

If you're looking for something less expensive, try the Internet News Alert (http://www.newsalert.com), which offers real-time quotes as well as news from wire services for $3.95 per month. You can run searches using a Boolean search operator, though every article after the first one you retrieve in a day costs $1.95.

Making the investment. Once you've selected some funds or stocks, of course, you have to buy them.

The cheapest way to buy stocks is through a discount broker. If you buy a few hundred shares of a stock, expect to pay a transaction fee of between $30 and $100. (If you buy no-load mutual funds directly from the sponsoring company, you can avoid transaction fees altogether.)

You can reduce your transaction fees by placing your trades electronically. If you're already using a major discount broker, such as Schwab (http://www.schwab.com), Fidelity (http://www.fid-inv.com), or Jack White & Company (http://www.pawws.com/jwc), check out its site on the World Wide Web; you'll save 10 percent off your fees by trading online. All of these brokers also offer online access to your account information.

Electronic brokers such as eTrade (http://www.etrade.com) cut commissions even further, typically to half or less of what larger discounters like Fidelity or Schwab charge. These prices are tempting and certainly worth considering, but they sometimes come at a price in terms of customer service. "I got no response for 26 days after sending eTrade a check to open my account," complains Joshua Fairbanks, a full-time investor from Seattle. Fairbanks finally had to call eTrade himself to get a confirmation number. Every time he called, "I got stuck on hold from 10 to 35 minutes." Fairbanks canceled his account with eTrade after about a month. According to eTrade staffers, the company received Fairbanks' application on July 1, 1996, opened his account July 5, and processed his first trade July 18; they could not explain the 26-day delay. They admit to having had problems answering calls promptly last summer, but claim an ▶

Tips for Investing

Compare Mortgages

REFINANCING YOUR HOME? You should probably compare different loan options.

In Quicken, select *Features•Planning•Financial Planners•Refinance.* This gives you a dialog box for determining whether refinancing makes sense and calculating how long it will take you to recoup the costs of refinancing.

Money includes a useful feature that lets you compare mortgages. From the *Go To* button, select *Planning Wizards* and click *Mortgage Planner.* A series of dialog boxes will ask you detailed questions about each mortgage; then you can compare the overall costs and get advice on how to interpret the comparisons.

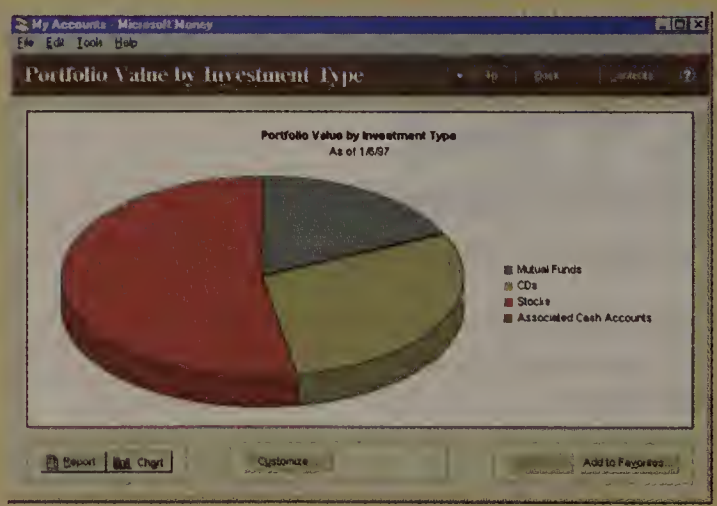
SEC: Find the Right Company or Fund

THE SECURITIES and Exchange Commission's Web site is full of useful information—once you know how to use it.

To research a company or mutual fund, go to SEC's 'Search the EDGAR Database' page (http://www.sec.gov/edaux/searches.htm) and click *CIK (Central Index Key) and Ticker Symbol Lookup.* Type as much of the company's name as possible, and avoid using abbreviations or acronyms. For example, enter **International Business Machines**, not **IBM**.

The result will be an ungainly number. Highlight it and press **<Ctrl>-C** to copy it to the Clipboard. Backtrack to the 'Search the EDGAR Database' page and select *Search the EDGAR Archives.* In the resulting page's 'search keywords' field, press **<Ctrl>-V** to paste in the CIK of the company or fund you're researching, and then press **<Enter>**. You'll get a listing of every document that the chosen company has filed electronically with the SEC.

With the document list in front of you, scan the 'Form Type' column to find 10-Q and 10-K documents. These contain the company's quarterly and annual financial filings—an investor's primary research tools.



COMPARE YOUR INVESTMENTS. Money (as well as Quicken) charts how different types of investments are doing.

Track Your Investment Returns

QUICKEN AND MONEY can calculate your investment returns two different ways, and it's important to know which is which. A *portfolio value* report calculates the cost basis of your investments, while an *investment performance* report shows the more accurate internal rate of return. To find these two reports in Quicken, select *Reports•Investment.* In Money, click *Go To,* select *Report and Chart Gallery,* and click the *Investments* button.

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Introducing the new HP SureStore CD-Writer.

It's a fast paced world. To succeed, you have to make an impression. And there's no better way to make an impression than on CD using the new HP SureStore CD-Writer 6020 CD-Recordable drive. CD-Writer lets you ❶ record awesome multimedia presentations to take on the road. Or ❷ deliver CDs to clients and others with total confidence that it can play in millions of CD-ROM readers worldwide.

The robust software suite included with the CD-Writer lets you ❸ copy all your drafts to CD quickly and easily. And files stored on CD can be retrieved in seconds. It's ideal for ❹ creating permanent archives of your files. What's more, CD-Writer can ❺ make custom audio CDs that can be played on stereo CD players at home or in the car. CD-Writer is also a 6X* CD reader so it can ❻ play all your CD-ROMs smoothly. Now we're cruisin'.

Given all the things you can do with the HP SureStore CD-Writer, what's your drive? Check it out. Visit your reseller or call 1-800-826-4111 ext. 2268. Or you can steer toward the web and find HP SureStore CD-Writer at www.hp.com/go/storage.

HEWLETT PACKARD

*Actual speed may vary according to application used

average response time of 2 minutes as of October.

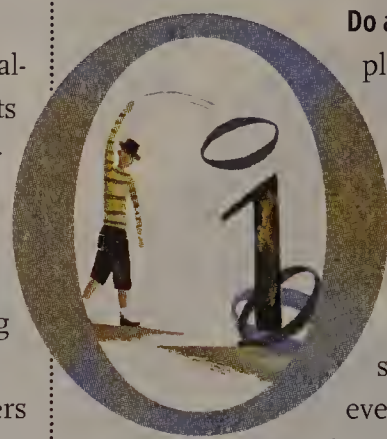
Track your investments. Once you've made your investments, you can use your computer to keep track of how they're doing. Actually, if you've invested only in funds, you can skip using your computer for this and simply read the funds' annual reports, which give you your total return.

If you've bought stocks or want your computer to help you calculate your portfolio's overall returns, you should set up accounts in your checkbook program and enter the data from your quarterly statements. You might be wondering, Do I have to type in all that data? Unfortunately, you'll probably have to. Both Quicken and Money can go online and download the information for you, but the data they grab is incomplete, lacking dividends that add value to your investments.

Be careful not to misinterpret the return reports. The numbers are often confusing. Don't mistake the *cost basis* of your investments for the *internal rate of return*. Cost basis, which is useful primarily for taxes, takes the amount of your original investment and continues to add to that your reinvested dividends and capital gains, resulting in a lower-than-actual return. The true picture of how your investments are faring is the internal rate of return, which takes into account the dividends, interest, and other payments you receive as well as increases and decreases in the value of the investment.

RETIREMENT PLANNING

YOU DON'T WANT TO WORK your whole life, do you? With the decline of corporate pension plans and the uncertainty of a burdened Social Security system, the only way you can be sure of retiring in comfort is to start preparing for it now.



Do a quick calculation. Try out the retirement planning calculator built into checkbook programs just to see where you stand. They're simplistic, but they can give you a general idea of how much you'll need to save to live comfortably during your golden years.

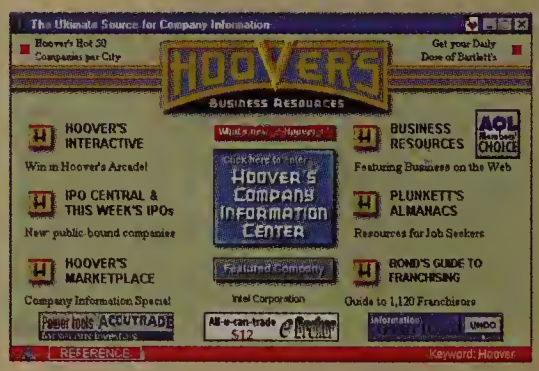
Get retirement planning software. To seriously plan for your retirement, however, you need something that lets you play with assumptions like your tax rate, or specify how much of your savings is inside versus outside retirement accounts. For that, you'll want something like the Vanguard Retirement Planner 3.0 or Quicken Financial Planner 2.0. These programs allow you to test multiple scenarios ("Okay, is Bora Bora an option if I save 12 percent a year?"), offer advice, and hold your hand along the way.

When you first try one of these programs, you may be told that you need to save far more ▶

Investing by Modem

PUT YOUR MONEY where your modem is. These sites and services let you research your investments and options, get quotes, or trade stocks online.

HOOVER'S COMPANY PROFILES (America Online: keyword Hoover; CompuServe: go hoover) Here you'll find a tremendous amount of basic information on publicly held companies. The AOL version links to company Web sites as well as to the SEC site.



NEWS ALERT (http://www.newsalert.com) Five bucks a month buys you real-time quotes and financial news. Searches cost extra, but the fees are reasonable.

STANDARD & POOR'S (CompuServe: go s&p) If you can stand the dreadful, text-based user interface, Standard & Poor's respected market analysts offer industry and individual stock reports for $1 and $2, respectively.

STRATEGIC INVESTOR (Prodigy: jump strategic investor) This database on thousands of stocks and mutual funds lets you screen the information to find just the offerings that meet your criteria. Cost is $14.95 per month.

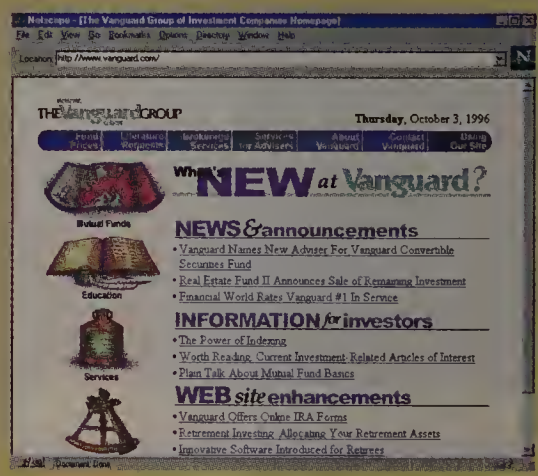
DOW JONES BUSINESS CENTER (America Online: keyword dow jones) Here's a wealth of daily news on the financial markets and business world, including articles from Dow Jones publications: *Barron's, The Wall Street Journal* (U.S. and foreign editions), and *National Business Employment Weekly.*

BUSINESS DATABASE PLUS (CompuServe: go busdb) Before you invest in hog futures, find out about their past. Business Database Plus provides access to hundreds of businesses plus industry and special-interest publications.

SECURITIES AND EXCHANGE COMMISSION (http://www.sec.gov) The best collection of investment information on the Web. All publicly held companies and mutual funds must file annual and quarterly reports and other documents with the SEC, so it has just about everything—assuming you can find it.

U.S. TREASURY (http://www.ny.frb.org) If you own any old Treasury bonds with variable interest rates, you can use this site to determine what they're worth today and what current interest rate you're earning.

WALL STREET JOURNAL INTERACTIVE EDITION (http://interactive.wsj.com/) For $49 per year ($29 if you subscribe to the printed *Wall Street Journal*), you can create your own personalized online version of America's premier financial news daily.



VANGUARD (http://www.vanguard.com) Along with information on Vanguard's own excellent investment portfolios, you'll find high-quality educational materials here.

SCHWAB (http://www.schwab.com) The U.S.'s largest discount broker site offers cut-rate security trades if you're willing to forgo personal service. This site also has some reasonably helpful resources.

Let The Perfect Expert Find the Answers.

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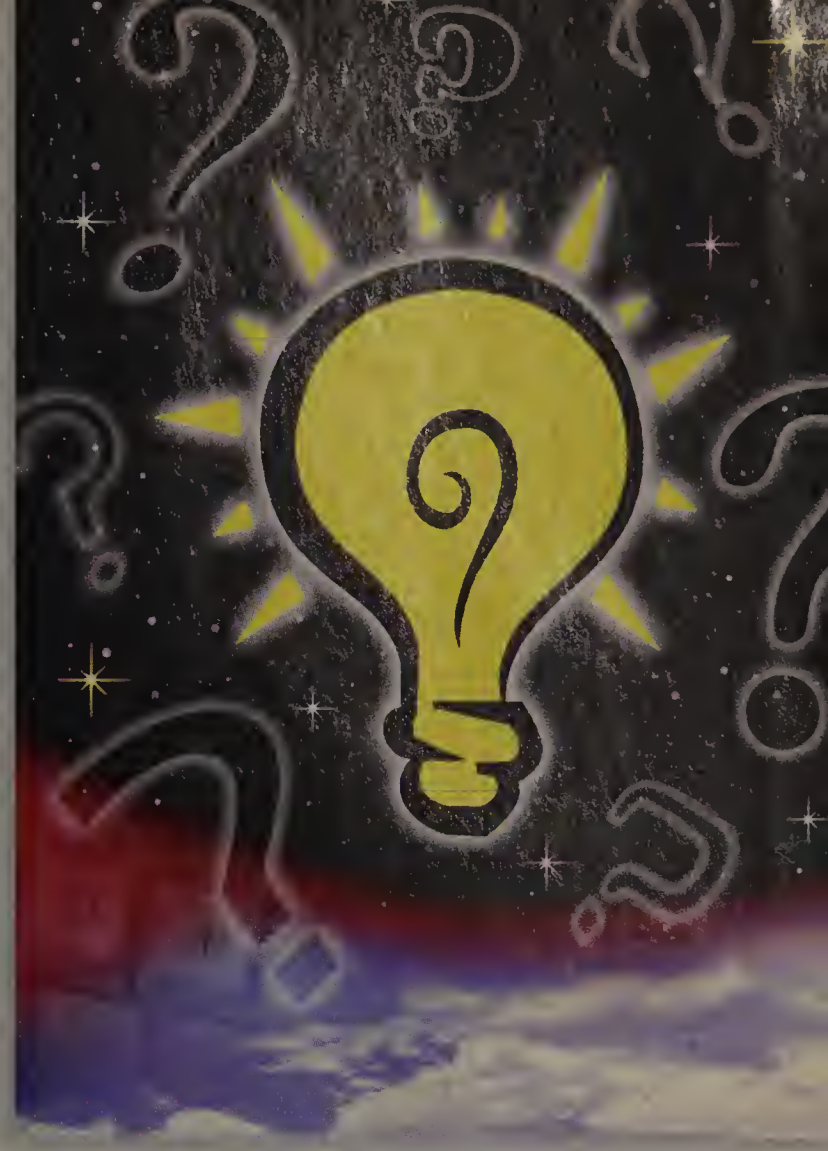
Say goodbye to less-than-intuitive help menus and complicated computer jargon. Corel's *The Perfect Expert* help feature taps into the power and versatility of industry-leading office software and makes it work for you. It's available in our 32-bit office suites and works as fast as you do.

Need expert advice in a hurry? Just click on Ask the Perfect Expert™. Ask any task-related question in ordinary, everyday language. Easy to access and designed to offer time-saving solutions for a wide variety of office tasks, it's quite simply the fastest and friendliest way to get the help you need, when you need it. *Features that help you finish faster with less effort. Corel® WordPerfect® Suite 7 and Corel® Office Professional 7, the best in office suite applications.*

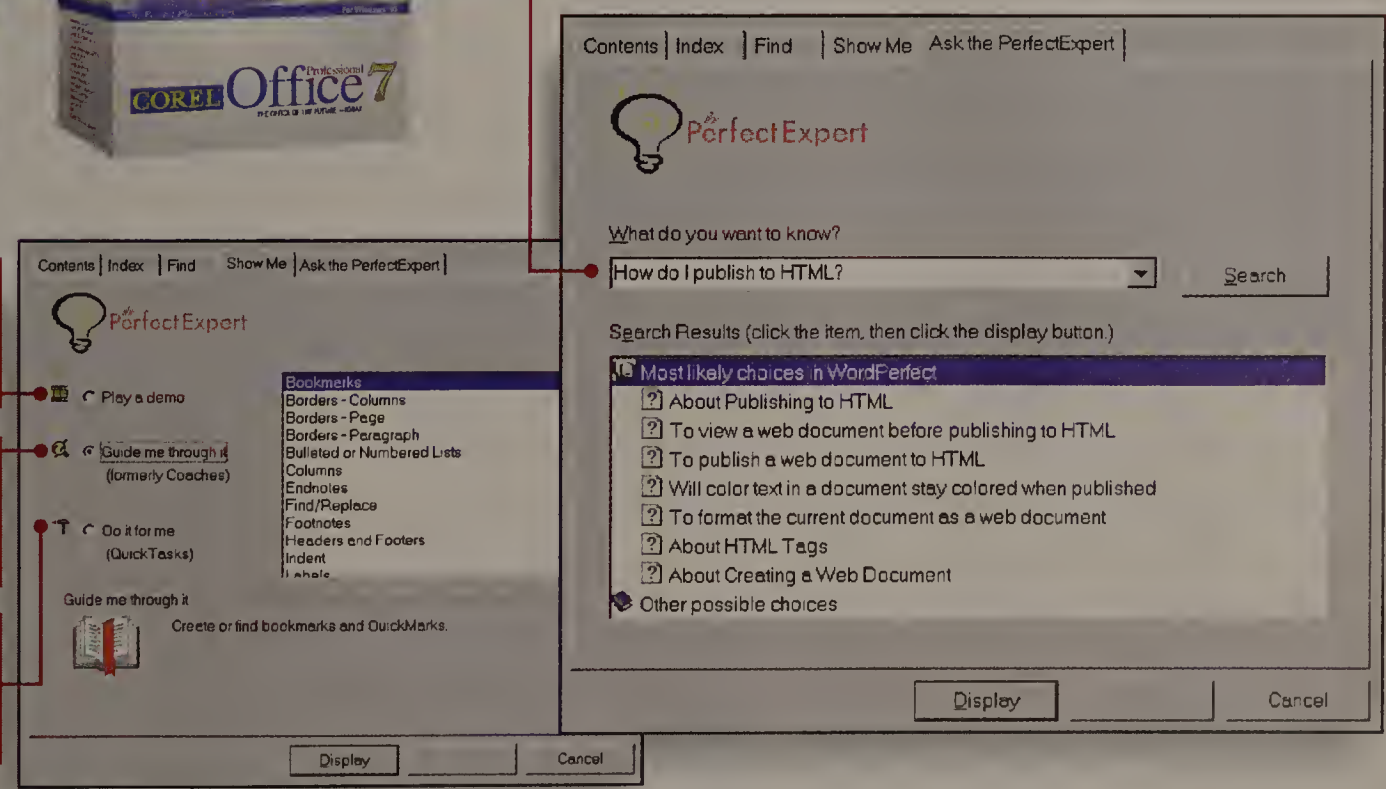


Ask a question in your own words and The Perfect Expert will display a list of available help options.

Choose ***Play a demo*** for a demonstration of a specific feature or task.

Let The Perfect Expert walk you step by step through a task.

Choose ***Do it for me*** to automate everyday and more complex tasks.



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money than you think you ever can. Don't get too depressed. You can improve your long-term picture by investing more aggressively, tapping your home's equity, and scaling back your old-age spending needs. Maybe you'll even inherit something by then.

Manage your retirement. When Frank Heinisch of San Ramon, California, retired from AT&T at age 48, he was already using the Vanguard Retirement Planner, but he found it wasn't enough. So he bought the Vanguard Retirement Manager, which helped him figure a budget, manage his nest egg, and minimize estate taxes. It "confirmed what I thought I had planned out for the future," he says. "This works out much better."

THE BOTTOM LINE

REMEMBER THAT SOFTWARE and online services are nothing more than tools. If a program helps you get organized, great. If it finally motivates you to do something you have been putting off for a long time, so much the better. But if it causes you to fritter away more time on a financial task than you ever did before, use it selectively or forget it.

No program or service understands the whole of your financial needs. You have to keep the big picture in mind the whole time and make the important decisions yourself.

Eric Tyson is a syndicated finance writer, counselor, and author of several best-selling books including Personal Finance for Dummies, 2nd Edition *(IDG Books, 1996, 800/762-2974) and* Investing for Dummies *(IDG Books, 1996, 800/762-2974).*

WHERE TO BUY

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- **MANAGING YOUR MONEY** $20, Meca, 800/288-6322, http://www.mymnet.com
  READER SERVICE NO. 732
- **MICROSOFT MONEY 5.0** $35, Microsoft, 800/426-9400, http://www.microsoft.com/moneyzone
  READER SERVICE NO. 733
- **PRINCIPIA PLUS** $795 a year, $495 a quarter, or $295 a month, Morningstar, 800/876-5005
  READER SERVICE NO. 734
- **QUICKEN 6.0** $40, **QUICKEN FINANCIAL PLANNER 2.0** $30, **TURBOTAX** $35, Intuit, 800/446-8848, http://www.intuit.com
- **VALUE LINE INVESTMENT SURVEY FOR WINDOWS** 2-month trial $55, Value Line, 800/535-9648
  READER SERVICE NO. 735
- **VANGUARD RETIREMENT PLANNER 3.0** $15, **VANGUARD RETIREMENT MANAGER 1.0** $25, The Vanguard Group, 800/950-1971, http://www.vanguard.com
  READER SERVICE NO. 736
- **WILLMAKER** $42, **HOW TO DO YOUR OWN DIVORCE** $24.95 (book plus disk), Nolo Press, 800/992-6656, http://www.nolo.com
  READER SERVICE NO. 737

FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS ARTICLE, CHOOSE READER SERVICE NO. 915.

Tips for Retirement Planning

Reduce Inflation

BOTH QUICKEN Financial Planner and Vanguard Retirement Planner, by default, calculate your retirement needs based on an average annual inflation rate of 4 percent. Vanguard also provides data showing that over the past 30 years inflation has averaged 5.4 percent. However, 30 years is a small slice of U.S. economic history and includes the double-digit inflation years of the late 1970s and early 1980s. Consider using a 3 percent inflation rate; that's been the average annual inflation this century, and it's still higher than the 1.3 percent average of the past two centuries.

Projecting Investment Returns

OVERESTIMATE YOUR INVESTING prowess and you could fall far short of the amount of money you'll need to save. Underestimate your expected returns and your goal will seem discouragingly hopeless. As a rule, the more money you put into stocks (as opposed to mutual funds), the greater your return will be (assuming you follow the stock market and invest wisely).

Here are some guidelines for estimating your investment returns:

Portion Invested	Average Annual Return
80 to 100 percent	10 to 12 percent
60 to 80 percent	9 percent
40 to 60 percent	8 percent
20 to 40 percent	7 percent

Figuring Your Tax Rate

YOU'LL NEED TO CALCULATE your overall tax rate to input into your retirement planning program. Get out your most recent federal and state income tax returns. Look up the total tax you paid, then divide that frighteningly large number by your total taxable income. The resulting percentage is your average tax rate, which is the number to plug into the program.

If you're expecting your income to change radically in the near future—for instance, if you're about to retire or are expecting a promotion—you could crank different income numbers through your tax returns to come up with a better estimate.

Know the Risks

ONCE YOU COME UP WITH an investment mix, be sure you understand the risks.

With the Vanguard Retirement Planner, check out the Portfolio Planner Risk area. Here, you can see the probable downside of a portfolio similar to yours. Using historical data, the program shows you the worst years such a portfolio has had over time.

In Quicken Financial Planner's Planned Return section, click the *Historical* and *Projected* buttons. Though history won't repeat itself exactly, you'll do better to embark on your investing endeavors with both eyes wide open. Knowing how bad things *can* get will hopefully increase your chances of staying the course if the markets tank. ■

Good choice.℠

At Phil's Café, "Monday's Chef's Special" is the obvious choice. And when it comes to buying a computer, the choice is just as clear. Choose Quantex and you'll always get the finest, name-brand-only components and state-of-the-art technology, at a competitive price. Period.

Precision engineering. **ISO 9002** certification of our manufacturing facilities reaffirms our conformance to the strictest standards. Each system is 100% Novell Certified, too. Choose Quantex and you choose reliability

State-of-the-art technology. Quantex gets it to you first. This month, we're featuring three new technologies: 12X CD-ROM, Video Phone, and ISDN.

Responsive care after the sale. Featuring our NEW! 3-Year Warranty, the Quantex Care Package bolsters our commitment to you. Make the Right Choice. Give us a call today.

QUANTEX
GOOD CHOICE

Videophoning. The gift of presence.

HOME series

Full screen video phone image is for illustration purposes only.

The Quantex Video Phone PC keeps the home fires burning. It's holiday time and the candles are burning low. You're missing her. Is she missing you? You reach for the phone to call. She answers. You decide to try something new. You both boot up your Quantex QP5/VM-1's with Video Phone/Intel ProShare™ technology which connects your two computers over a standard phone line. In just seconds, her sparkling face is displayed in the "Guest Window" on your PC screen with simultaneous audio and video. Now you can toast the memories together in a whole new way.

Grandparents enjoying their new Quantex Video Phone PC

Sound like incredible holiday magic? It is. And the magician is Quantex, working side-by-side with Intel to bring you *the first Video Phone available on a home PC!* Video Phone is now standard fare with the Quantex VM-1 Systems over a single, plain old telephone wire. No installation struggles, and meticulously engineered for your Quantex machine to give you true "plug and play" performance. Video Phone from Quantex is anamazing phenomenon to share with your college-bound kids, distant friends, closest relatives, even your colleagues--on special days and everyday.

Upgrade specials

- MS Natural Keyboard (Upgrade from the 104-Key Keyboard) . . $39
- MS Sidewinder 3D Pro Digital Joystick $59
- HP Color Deskjet 680c Printer (Covered by manufacturer's warranty only) . $299
- Altec Lansing ACS-400 Surround Sound Speakers w/ACS-250 Subwoofer. $120
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Sound Card Comparison

	Direct X Support	Modem Connection	VideoPhone Connection
Ensoniq-Vivo90	Yes	Yes	Yes
Sound Blaster AWE32	No	No	No
Gravis UltraSound P&P Pro	No	No	No

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QP5/166 VM-1 .....$2149
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- 3.5" 1.44MB Floppy Drive
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- MAG 15" .25dp Digital Monitor (14.0" viewable) w/SONY Trinitron Tube
- 33.6 Kbps Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 12X 125ms EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-40 Speakers
- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Family Software Bundle (Preinstalled)
- 3-year limited Warranty

QP5/166 M-2 .....$1799
QP5/200 M-2 .....$1899

QP5/166 M-3 $2099

Business lease:$ 74/month

- Intel 166MHz Pentium Processor
- 24MB EDO Memory / 512KB Pipelined Burst Cache
- 2.5GB EIDE Mode 4 Hard Drive
- 3.5" 1.44MB Floppy Drive
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  (Free 3D game included!)
- MAG 17" Digital Monitor (16.1" viewable)
- 33.6 Kbps Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 12X 125ms EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-40 Speakers
- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
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- 3-year limited Warranty

QP5/133 M-3 .....$1899
QP5/200 M-3 .....$2199

QP5/200 M-4 $2399

Business lease:$ 84/month

- Intel 200MHz Pentium Processor
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  (Free 3D game included!)
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- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-45 Speakers w/Subwoofer
- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
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- The Modern Age Books Windows95 Primer
- America Online, Prodigy, CompuServe-(one month trial each)
- NetCruiser Plus (Over 400 hrs of free Internet access for one month)
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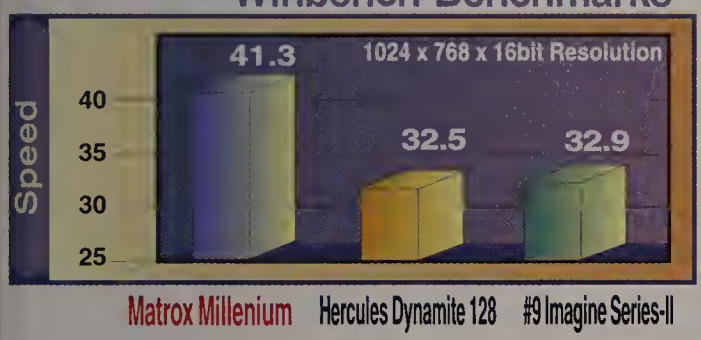

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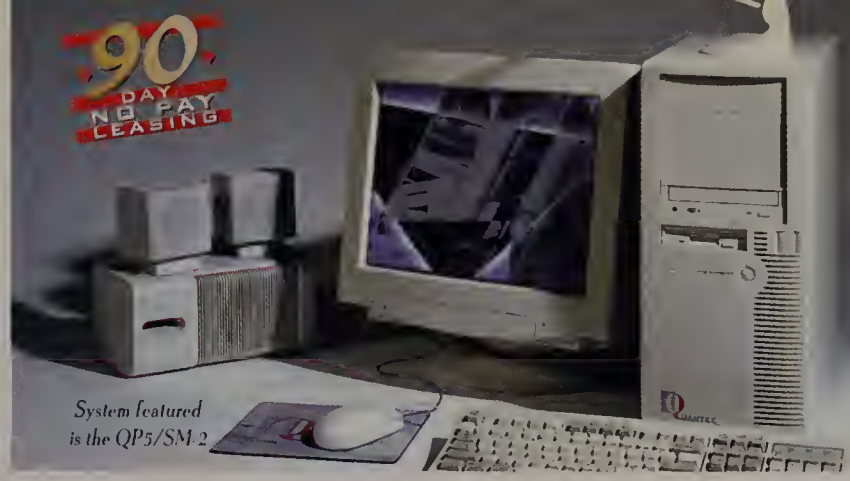

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- 33.6 Kbps Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 12X 125ms EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-45 Speakers w/Subwoofer
- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
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QP5/200 SM-1 .....$2099

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- 2.5GB EIDE Mode 4 Hard Drive
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- Toshiba 12X 125ms EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-45 Speakers w/Subwoofer
- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Professional Software Bundle (Preinstalled)
- 3-year limited Warranty

QP5/133 SM-2 .....$2099
QP5/200 SM-2 .....$2399

QP6/200 SM-3 $2799

Business lease:$ 98/month

- Intel 200MHz Pentium Pro Processor
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- 3.2GB EIDE Mode 4 Hard Drive
- 3.5" 1.44MB Floppy Drive
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- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
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- Corel: Internet Mania, Print House
- Quicken SE
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- Meddermedia's Official Internet World™ Internet Yellow Pages
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For information on non-multimedia Pentium workstations, consult with your sales representative.

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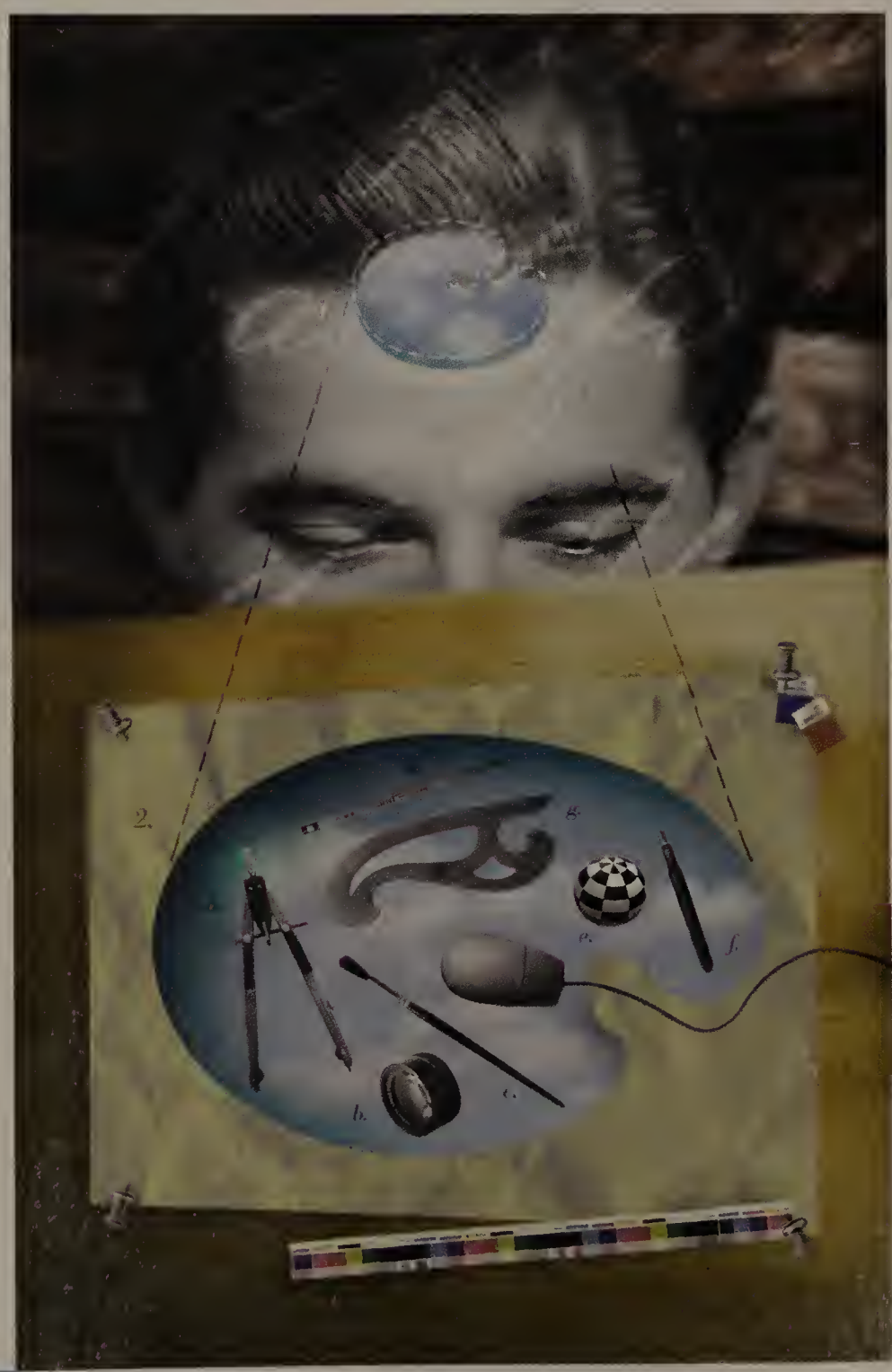
Graphics!

They're CHEAP. They're EASY. And they're GOOD-LOOKING.

Low-cost graphics packages—from clip art to Web utilities—make digital art as easy as a double-click.

IT WAS OSCAR WILDE who sniffed, "All art is quite useless." But he never saw what you can do with some of today's graphics packages. You can mimic Monet; take up chalk, pencil, paint, or crayons; do crazy things with photographs; and build flowcharts painlessly. If you're an artist, graphics software can help you work faster and more creatively. If you're not, a graphics package can make you look like one.

Graphics programs range from simple $50 packages for creating greeting cards to expensive, complex programs for professional illustrators, like Adobe's $895 ▶



BY RICHARD JANTZ

ILLUSTRATION BY STUART BRADFORD

Photoshop. For this review, we picked 12 low-cost Windows 95 graphics programs for nonartists who need to produce professional results quickly for business reports, home projects, or Web pages. Most are under $150 and are very easy to use, thanks to point-and-click interfaces, wizards, and ready-to-use content. Based on the packages' tools and approaches, we divided our reviews into three categories: creative tools, business software, and graphics utilities.

If you've been itching to try your hand at electronic art, the creative tools we recommend here should put you in seventh heaven. These products handhold you through image editing, painting, sketching, and 3-D modeling projects. It was tough to pick a favorite, so we chose two: Kai's Power Goo and Ulead's PhotoImpact, two very different image editors. With its colorful interface and ability to stretch photos, Power Goo at first looks like kids' software. But it's more: It lets you create beautiful surrealistic images. PhotoImpact is a great omnibus application that does not only image editing but also Web art and image management.

Our Favorites

EVERY ELECTRONIC ARTIST wanna-be should have Ulead's PhotoImpact, a $99 traditional image editor that also does Web art. HiJaak 95, $50, is the utilities package you don't want to be without if you have to manage more than a few image files. Visio, $149, is great for knocking together quick diagrams. For pure fun, get Kai's Power Goo, a $50 image editor that stretches the boundaries of what you can do with photographs.

Need to knock off some quick-and-dirty graphics for the office? Despite its many imitators, no business graphics package outdoes Visio at meat-and-potatoes art like flowcharts and simple floor plans.

If you keep any image files at all on your hard disk, you should consider buying a graphics utilities package to catalog and view them. HiJaak 95, a junior, $50 version of Quarterdeck's $279 HiJaak Pro, is the best all-around image manager.

Vendors of three packages reviewed—Dabbler 2.0, Poser 1.0, and SmartSketch 95—recommend using a stylus and pressure-sensitive graphics tablet. We got by fine with a mouse, but a stylus and graphics tablet may be worth buying (most cost between $150 and $300) if you'd rather draw with an input device shaped like a pen rather than a bar of soap.

If the products reviewed here are still too expensive for you, you might want to try a shareware graphics program. You can see minireviews and download 12 of our favorites from PC World Online (http://www.pcworld.com).

Creative Tools

Photo retouching, drawing, and 3-D software make art fun.

DABBLER 2.0

IS ARTIST'S BLOCK stifling your inner van Gogh? Put down the cutlery and pick up Fractal Design's Dabbler 2.0, the second most amazing "natural media" graphics package after Fractal's $379 Painter. A pared-down, simpler version of Painter, Dabbler gives you the tools you need to paint in the style of the great masters. It includes electronic chalks, pencils, crayons, markers, and stencils, more than 120 different paper textures, and filters for adding special effects.

PAINT SPATTERS AND MARKERS SQUEAK in Fractal Design's delightful Dabbler. It uses "natural media" and filters to make your work look like fine art.

Here's the amazing part: The tools respond like traditional art materials. Felt markers bleed, spray paint spatters, and crayon color builds up. Fractal got the sound effects delightfully right, too. The markers squeak, pens scratch, and the charcoal rasps while you draw.

After you're done, you can use the filters for effects that turn your run-of-the-mill picture into a ringer for great art. The Texturize command, for instance, mimics the classic Impressionist style.

Dabbler comes with 100 stock photos and great tutorials, including digital movies that teach drawing. —*Richard Jantz*

Dabbler 2.0 $49 street; Windows 95, Windows 3.1, Macintosh; Fractal Design; 800/297-2665; http://www.fractal.com/

READER SERVICE NO. 630

KAI'S POWER GOO

ANY HALF-DECENT image editing program will let you commit zany acts of art against ordinary photographs, but Kai's Power Goo is in a mischievous league of its own. This offbeat image editing program specializes in real-time photo distortion and blending effects. Just click a button (Bulge, Smear, Smooth, Squeeze, and so on) and drag the mouse over the part of a picture you want to change. Goo's superfast rendering engine (MetaTools calls it "liquid image technology") allows you to see the distortion as you move your

REARRANGE SOMEBODY'S FACE with Kai's Power Goo, a playful image editor that does real-time photo distortion.

mouse, so you know just how far to go to get the effect you want. No other image editor does anything like it.

Power Goo lets you print edited images or save them in BMP or Photoshop PSD formats, but you'll need another program to convert them into JPEG or GIF format for posting on a Web page. You can also save a series of pictures to create a brief, morph-like movie in the AVI video format or in MetaTools' proprietary format. Power Goo comes with a minilibrary of 80 stock photos (people, animals, objects) so you can get off to a fast, gleeful start. —*R. J.*

Kai's Power Goo $50 street; Windows 95, Windows NT, Macintosh; MetaTools Inc.; 805/566-6200; http://www.metatools.com

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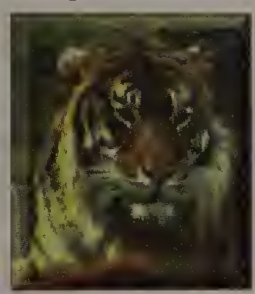


CREATE YOUR OWN Internet graphics like this button—or bullets, logos, and backgrounds—using PhotoImpact's new built-in Web tools.

PHOTODELUXE 1.0

IF YOU WOULD RATHER touch up photos than distort them, a more traditional image editing program like PhotoDeluxe might suit you better than Power Goo. PhotoDeluxe is Photoshop without all the confusing palettes and color separation tools. Think "Photoshop for Dummies." PhotoDeluxe takes a handful of Photoshop's most useful features and wraps them in tabs and step-by-step wizardlike procedures for foolproof image editing. I found many of its photo touch-up and transformation projects useful for adult beginners—Remove Red Eye, for instance, turns a process that can be confusing in Photoshop into one simple, can't-miss step. Other projects, like Disguise Your Face—which adds glasses and moustache to a photo—will appeal mostly to kids. Fortunately, you can skip the hand-holding and jump right to the manipulation tools and effects you want.

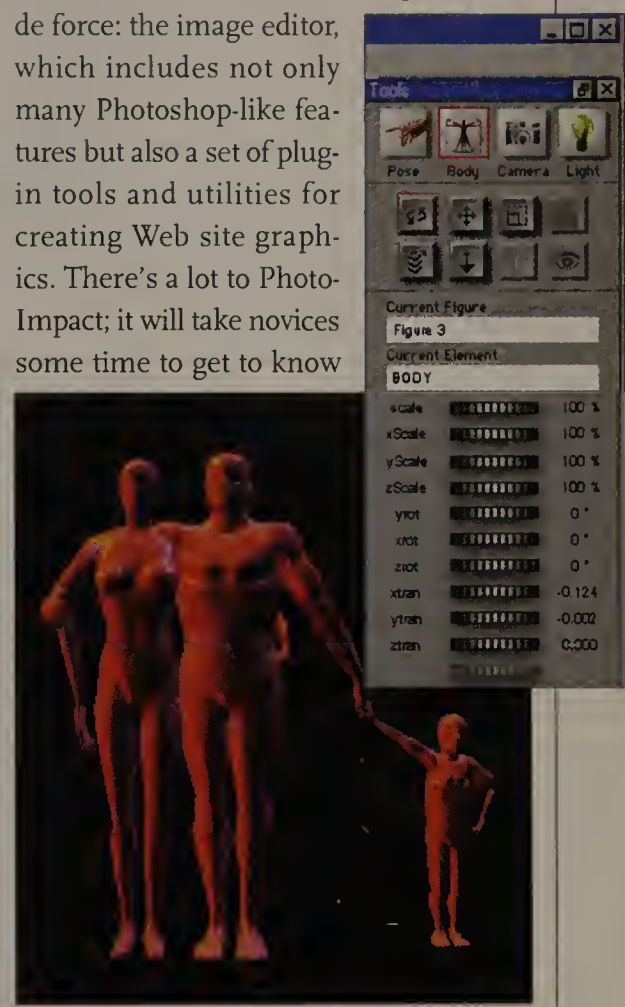
In addition to editing your own images, you can work with the 500-plus stock photos and clip art images that are included in the package, ranging from people and animals to backgrounds and scenic views. PhotoDeluxe also provides templates that make it easy to add your images to report covers, cards, calendars, flyers, signs, and other print projects. —*R. J.*

PhotoDeluxe 1.0 $49 street; Windows 95, Windows 3.1, Windows NT; Adobe Systems; 800/888-6293; http://www.adobe.com

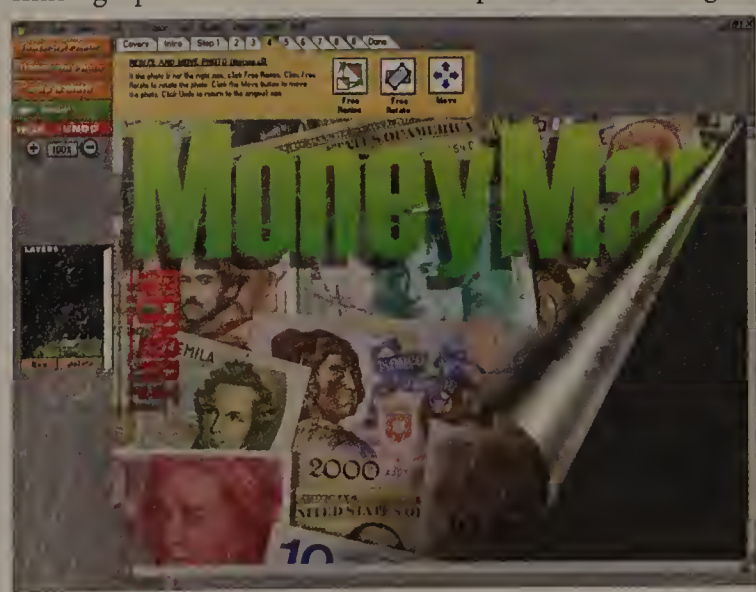
READER SERVICE NO. 632

PHOTOIMPACT 3.01 WITH WEBEXTENSION

IF YOU'RE going to buy only one graphics package this year, Ulead Systems' PhotoImpact 3.01 is a good choice—especially if you need to create Web graphics. Unlike Power Goo or PhotoDeluxe, PhotoImpact is a fairly sophisticated mini-graphics suite. In one box, it provides powerful image editing, viewing, cataloging, browsing, and screen capture software. PhotoImpact's image management tools are not as fast or as convenient as those in HiJaak 95 (see review in the Graphics Utilities section), but its creative tools are much better. PhotoImpact's tour de force: the image editor, which includes not only many Photoshop-like features but also a set of plug-in tools and utilities for creating Web site graphics. There's a lot to PhotoImpact; it will take novices some time to get to know all the features. Fortunately, the package comes with lots of hand-holding and a helpful tutorial. For instance, Guided Workflow Tools direct you step-by-step from image acquisition through image enhancement. —*R. J.*



MEET THE POSER FAMILY of malleable 3-D figures. You can set height and weight, and twist and turn them to your heart's content.



PHOTODELUXE IS AN EXTREMELY EASY-TO-USE version of Photoshop; it's impossible to get lost—or too creative.

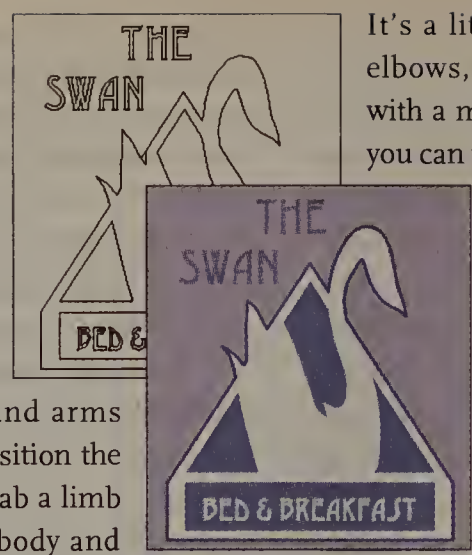
PhotoImpact 3.01 With WebExtension $99 street; Windows 95, Windows NT; Ulead Systems, Inc.; 800/858-5323, 310/523-9393; http://www.ulead.com

READER SERVICE NO. 633

POSER 1.0

MOM ALWAYS SAID she liked your stick figures, but she won't be at tomorrow's presentation. To put recognizably ▶

human figures into your artwork, try Fractal Design's Poser. It helps you create lifelike 3-D people in no time at all. You start with a male form (the default) in the da Vinci pose, with feet together and arms outstretched. To reposition the figure, you simply grab a limb or other part of the body and drag it to where you want it to go. As you move one part, the rest of the body moves right along with it. For example, when you move a leg to a new position, voilà—the hips and torso follow. All I really had to practice getting right was joints.



SMARTSKETCH'S "paint" tools actually produce vector-based drawings.

It's a little difficult to reposition elbows, wrists, knees, and ankles with a mouse. For greater precision you can use the Parameter Dials dialog box, like I did, or a graphics tablet.

The program comes with predefined poses you can easily apply. You can also store your own poses for future use. One picture can contain multiple bodies, each of which can be a different sex, age, height, and weight. Poser people appear unclothed by default, but prudes can add what appear to be bodysuits, giving the images an android look. When you're done, you can export your figures in BMP, TIF, DXF, or RIB formats and work with them in your favorite draw program. By the time you read this, Poser 2.0 should be out, with animation and even more realistic figures. —*Cathy Kenny*

Poser 1.0 $99 street; Windows 95, Windows NT, Windows 3.1, Macintosh; Fractal Design; 800/297-2665; http://www.fractal.com/

READER SERVICE NO. 634

SMARTSKETCH 95

WHEN CLIP ART WON'T CUT IT, it's easy to create something unique in SmartSketch 95. But you'll need some artistic chops to pull it off. SmartSketch has an inviting interface, great tutorials, and "intelligent" helpers that automatically straighten lines and smooth curves. After that, however, you're all alone with SmartSketch's pencils and brushes. ▶

Graphics Suites Have It All

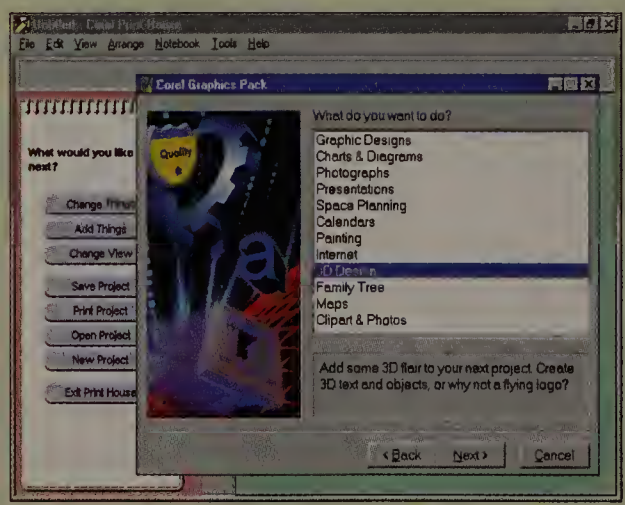
GRAPHICS SUITES are to designers what office suites are to businesspeople. In one bundle you can buy a larger variety of graphics tools than you'll get from a single, stand-alone package. The three best graphics suites—Corel Graphics Pack, CorelDraw 7, and Micrografx's ABC Graphics Suite 95—have draw and paint programs, graphics utilities, and a generous amount of clip art. But if you decide to go with any of these suites, you'll need a Ponderosa-size hard drive. Basic installations alone require 80MB, 85MB, and 180MB, respectively.

Budget Suites. If money is tight, consider the $100 Corel Graphics Pack, a bargain-basement suite with a wizardlike main menu. The package's Corel Photo Paint 6 image editing application is about as good as any of the stand-alone versions we review here. CorelFlow 3 is for business diagrams, and Corel Presents 6 is for presentations.

Micrografx's ABC Graphics Suite, $150, includes a higher-end draw program than Corel Graphics Pack, and the interface design it shares with Microsoft Office 95 makes it a wise choice for users of that suite. Designer 6 is an easy-to-use draw program that boasts good technical drawing tools but not the advanced color handling and editing tools found in CorelDraw. ABC also has Picture Publisher 6, an image editing program on a par with Corel Photo Paint 6; ABC FlowCharter 6 for creating diagrams; and ABC Media Manager 6 for managing files.

GRAPHICS SUITES give you more software for your money than stand-alone packages, but they take up a lot of disk space.

Everything but the Kitchen Sink. CorelDraw is the most popular graphics suite on the market, as well as one of the most expensive. As we went to press, Corel was preparing to ship CorelDraw 7, with an expected street price of $575. The package should be faster than the current version 6, with a new interface and beefed-up draw and paint programs. Besides its complex and powerful draw program—which is also called CorelDraw—the suite includes Corel Photo Paint 7, Corel Multimedia Manager, Corel Dream 3-D, and Corel Motion 3-D, plus a gargantuan library of clip art images, media clips, and fonts. It's the best pick for anyone who needs professional tools, such as color separations.



BEST LOW-COST graphics suite: Corel Graphics Pack. It has draw and paint modules, wizards, and clip art.

ABC Graphics Suite 95 $150 street; Micrografx, Inc.; 800/676-3110, 214/234-1769; http://www.micrografx.com

READER SERVICE NO. 642

CorelDraw 7 $575 street, Corel Graphics Pack $100 street; Corel Corp.; 800/772-6735, 613/728-8200; http://www.corel.com

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SmartSketch 95 looks like a combination draw and paint package, but it's actually all vector based. That means the program treats each element—whether painted or drawn—as a selectable object that you can move, resize, copy, or delete. As flexible as SmartSketch is, you'll still need a little time to learn how to use it proficiently, so don't expect to pump out a perfect logo in your first session. Fortunately, you can undo up to 200 steps, a nice security blanket for trial-and-error disasters. —*R. J.*

SmartSketch 95 $60 street; Windows 95, Windows NT, Windows 3.1, Macintosh; FutureWave Software, Inc.; 800/619-6193, 619/637-6190; http://www.futurewave.com/sales.htm

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3D F/X 2.0

FROM HOLLYWOOD BLOCKBUSTERS to TV commercials, three-dimensional computer animation is the next big graphics frontier. With Asymetrix's 3D F/X, you don't need a lot of expertise or expensive software to create your own 3-D action. A drag-and-drop interface and a generous collection of high-quality, ready-made 3-D objects (ranging from a '64 Thunderbird to Rodin's *Thinker*) makes 3D F/X easy to use. Guided by superb on-screen help, you can create a polished still picture or animated clip in minutes by assembling a few objects and adding textures and lighting effects. You can also turn any TrueType font into a colorful, spinning 3-D logo—a surefire way to spice up a ho-hum business presentation. And image quality is tops: The program can render your creations at any resolution, in up to 16 million colors, with realistic shadows and reflections. If you're making your first foray into 3-D animation, you can't miss with 3D F/X. —*Harry McCracken*

CREATING SLICK 3-D SCENES is a snap with 3D F/X's ready-made 3-D objects and drag-and-drop tools.

3D F/X 2.0 $70 street; Windows 95, Windows NT; Asymetrix; 206/462-0501; http://www.asymetrix.com/

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Business Software

Visio and WordPower produce boardroom-quality graphics.

VISIO 4.0

VISIO CORP.'S VISIO 4.0 makes creating a business diagram as easy as building a cabin out of Lincoln Logs, and almost as enjoyable. It's the best choice for creating flowcharts, block diagrams, organizational charts, office layouts, directional maps, and other common business drawings. Visio was first to popularize drag-and-drop charting through its use of stencils—templates filled with predrawn shapes and connectors. It's also a pioneer of "intelligent" lines and objects that automatically stay linked when you move, resize, and edit them. Version 4.0 adds wizards that automatically generate page layouts, organizational charts, and timelines. Visio also provides basic drawing tools for creating your own shapes and freehand drawings. Editing any part of a diagram is a snap—just right-click an object for instant access to its properties and formatting options. —*R. J.*

MAKE FLOOR PLANS with elements that stick together, even when you move or resize them, using Visio 4.0.

Visio 4.0 $149 street; Windows 95, Windows NT, Windows 3.1; Visio Corp.; 800/248-4746; http://www.visio.com/

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ASAP WORDPOWER 1.95

EVER NOTICE that most presentations contain only words? For people who don't care about adding multimedia to their talks, there's Software Publishing's ASAP WordPower, a speedy application devoted to quick and easy word charts. ASAP is no PowerPoint or Freelance Graphics. It's a retro utility that has no multimedia features, no built-in drawing tools, and no charting features. But what ASAP does it does well. With 22 layouts, 14 designs, and 18 color schemes, you can create thousands of different looks for your nongraphical, text-based charts. —*R. J.*

FAST, PUNCHY TEXT-BASED shows are ASAP WordPower's specialty. Change the layout or color scheme with one click.

ASAP WordPower 1.95 $99 street; Windows 95, Windows NT, Windows 3.1; Software Publishing Corp.; 800/336-8360; http://www.spco.com

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IF INSOMNIACS are hitting your Web site for some relief, maybe it's the graphics. You can put pizzazz into your pages with Corel Web.Gallery, a single CD-ROM of 7500 "Internet-ready" images (translation: files in GIF or JPEG format). Besides backgrounds, buttons, banners, drop caps, and dividers, the disc contains clip art and photo images of things such as food, flags, computers, travel, sports, transportation, and signs. You can sort the contents of Web.Gallery by category. Once you spy an image you want, you can drag and drop it to another application or copy it to your hard drive, compressing it if you like. You can also export images in a variety of file formats. —*C. K.*

Corel Web.Gallery $79 street; Windows 95, Windows 3.1; Corel Corp.; 800/772-6735, 613/728-8200; http://www.corel.com

READER SERVICE NO. 639

GET USEFUL THUMBNAILS of graphics files as well as handy file conversion tools with HiJaak 95.

HIJAAK 95

QUARTERDECK'S HIJAAK 95 is the graphics utility that should have come with Windows 95. The yardstick by which all other file conversion and screen capture utilities are measured, HiJaak lets you view and manage more than 75 different file formats. If you need to convert lots of graphics files from one format to another, this program's batch conversion option is a godsend. Its versatile screen capture features are also useful. But what really makes HiJaak shine is what it adds to Windows 95. Say good-bye to the generic icons Windows uses to display graphics files. HiJaak displays thumbnails of the images, so you can see what's in a file without having to open it. —*R. J.*

HiJaak 95 $50 street; Windows 95 only; Quarterdeck Corp.; 800/683-6696; http://www.quarterdeck.com/

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PhotoDisc Digital Stock Photography $149 to $299 per CD-ROM (list); Windows 95, Windows NT, Windows 3.1; PhotoDisc Inc.; 800/528-3472, 206/441-9355; http://www.photodisc.com

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Find the files from this article at http:// www.pcworld.com. Richard Jantz is a freelance writer in Kensington, California. Cathy Kenny is a freelance writer on personal productivity software. Harry McCracken is a senior associate editor for PC World.

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BIT MAPS HAVE AN artistic look (top). The vector version of this globe is a collection of smooth lines.

You Say Bit Map, I Say Vector

YOU MAY HEAR some graphics programs described as vector based and others referred to as bit mapped, or raster. Which is better? It depends. If you're retouching photos or other scanned images and want to create an artistic, "painted" look, get a bit-mapped paint or image editing program like Dabbler or PhotoDeluxe. These types of packages let you edit the thousands of bits, or dots, in a scanned image and apply special effects that can turn an ordinary photograph into a work of art. The tools are fun, but file size is a drawback: A bit-map image is much larger than the same image produced in vectors. Vector-based images, on the other hand, are composed of distinct objects—curves, lines, circles, squares, rectangles, and such. You can easily pick, move, and resize these parts, unlike the dots in a bit-map image. Design and illustration packages produce vector graphics. These packages are better than bit-mapped graphics programs for creating smooth graphics printed at a high resolution—logos, charts, diagrams, and other common office graphics—and therefore are often preferred by business users.

SmartSketch is an anomaly: It disguises its vector tools as bit-map ones to give you the best of both worlds—fun tools that produce easy-to-manipulate art.

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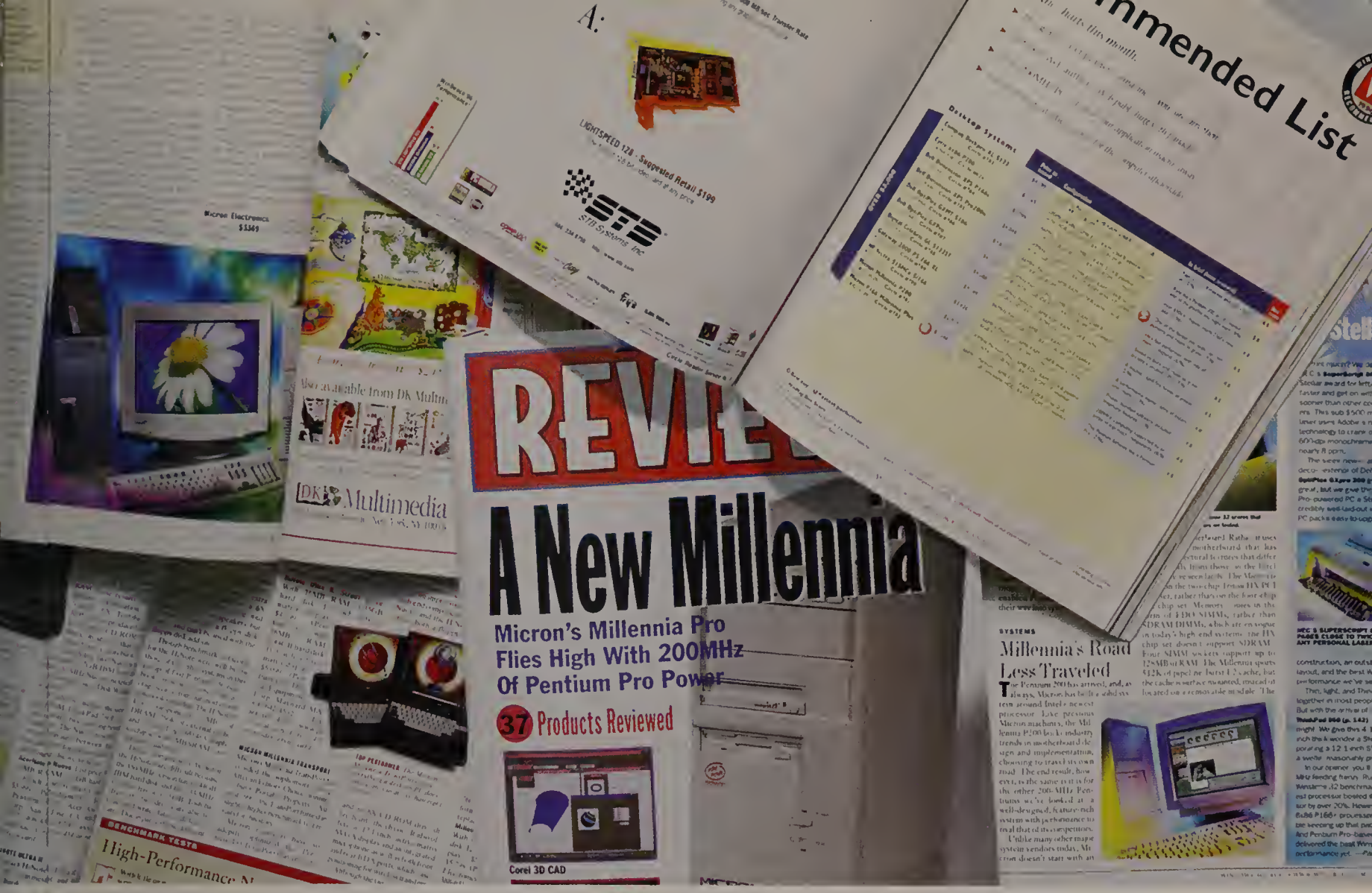

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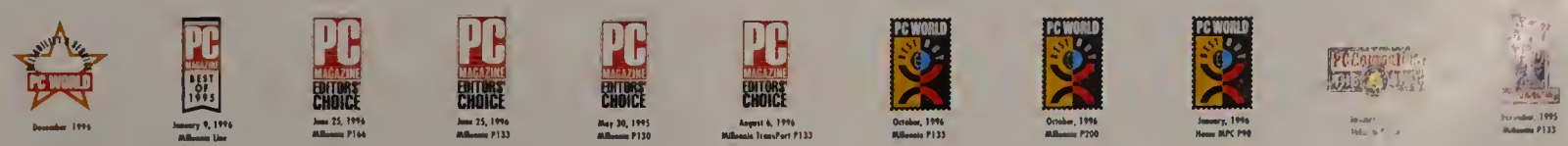

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Micron Millennia™	*"In short, Micron covers all the bases with this Best Buy"*	—***PC World,*** **March 1996**
Micron PowerServer™	*"This is definitely a best buy"*	—***Computer Shopper,*** **January 1996**
Micron Millennia TransPort™	*"...nearly a dead ringer for IBM's ThinkPad... but performs better and saves you about $2,500."*	—***PC Magazine,*** **April 1996**

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- 3.5" floppy drive
- *Tool-free* minitower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows NT® Workstation 4.0
- 5-year/3-year Micron Power warranty

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- Microsoft Works preinstalled

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- **32MB EDO RAM**
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†† Lock secures both Millennia TransPort and MicronDock

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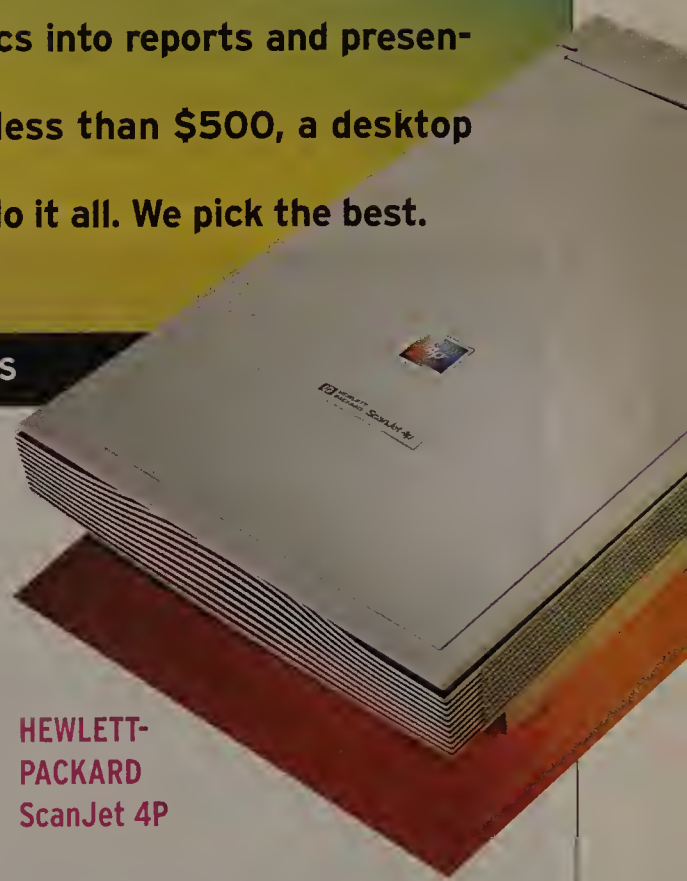
Scanners for the Rest of Us

Need to give Web pages pizzazz and splash graphics into reports and presentations? For less than $500, a desktop scanner can do it all. We pick the best.

STORM TECHNOLOGY
EasyPhoto
SmartPage

BY DEAN ANDREWS



HEWLETT-PACKARD
ScanJet 4P

THE BEST BUYS Need good color scans but don't have much free desk space? Consider Storm Technology's lunch box-size EasyPhoto SmartPage (left). For heavier-duty text and graphics jobs, HP's ScanJet 4P (right) delivers the best results.

IT'S EASY TO FORGET that the information on all that paper floating around your desk isn't also inside your PC—that signed contract you need to fax off right now, for example; or the photo that you need to add to tomorrow's sales presentation. Why can't you just stick a document into your PC and scan it?

Someday, most PCs will undoubtedly come with built-in scanners. One or two already do. Hewlett-Packard, for example, has a PC with a scanner for digitizing snapshots. In addition, both Compaq and HP sell keyboards with a built-in scanner. But until scanners are as common as floppy drives, your best bet for turning paper into pixels is to buy an inexpensive color scanner that sits next to your PC. Since last year, prices have dropped to as low as $250. If you can buy a PC, you can probably afford a 300-dot-per-inch color scanner to go with it. ▶

PHOTOGRAPH: STAN MUSILEK, PRODUCT PHOTOGRAPHS: PIERRE YVES GOAVEC

They are also getting easier to use: The software bundled with newer models is more sophisticated, with features that automatically adjust scan settings, and handy tools for quickly copying documents, annotating and sending faxes, and converting hard copy into something your word processor can understand.

We tested four sheetfed scanners from Logitech, Storm Technology, Umax, and Visioneer, and four flatbed models from Hewlett-Packard, Microtek, Plustek, and Umax. All cost under $500, and all but one, the sheetfed Visioneer PaperPort Vx, scan in color. The good news is that most of these scanners produce perfectly good images for presentations, Web pages, and newsletters. The bad news? Optical character recognition accuracy is still imperfect. Three of the sheetfed scanners and two flatbed models failed our two-column OCR test.

Of the eight devices, the flatbed scanner Best Buy, the HP ScanJet 4P, is tops in both image quality and OCR accuracy. The Storm Technology EasyPhoto SmartPage is our sheetfed scanner Best Buy. Its rugged design and sharp color scans are great for the home office.

Two scanners didn't make the review: Agfa's StudioScan IIsi flatbed arrived with the wrong drivers, and the correct ones came too late; Panasonic's new KS-300 sheetfed unit missed our deadline.

TIP 1

It sounds obvious, but always use the best-quality originals you can. That way, you'll spend much less time repairing an image after you've scanned it.

Choices: Flatbed Versus Sheetfed

WHEN YOU'RE THINKING about getting a scanner, the most difficult choice probably isn't whether to buy, but which type to buy. Compared to flatbeds, sheetfed units are cheaper, take up less desk space, and are easier to install. Except for the Logitech PageScan, the big drawback with most sheetfed scanners is that they scan only loose pages.

Sheetfed models take up far less space. The Visioneer PaperPort Vx, for example, is 12 inches wide and only 2.5 inches deep—compact enough to put behind your keyboard. They get that small by turning the scanner design inside out: Instead of the scan head moving over the paper, tiny rubber wheels pull the paper over the scan head. You simply slip a page into a slot, and it gets sucked through. However, the wheels don't always track perfectly, so pages may get skewed, creating a crooked scan. Sheetfed units focus more on managing paper flow than on getting an optimal scan. For example, to use your printer as a copier, simply feed a page into a sheetfed scanner, push a button, and pull the copy out of the printer.

If you do a lot of graphics or OCR

Best Buys

WE HAD A difficult time deciding which scanners deserved Best Buys. Among flatbed models, the Hewlett-Packard ScanJet 4P won out despite a tricky setup. The 4P did the best job of delivering consistently high-quality scans and accurate OCR.

It was an equally tough choice for a sheetfed scanner. But in the end, usable color scans, a durable multipage feeder, novice-friendly software, and a rugged design earned the Storm Technology EasyPhoto SmartPage a Best Buy.

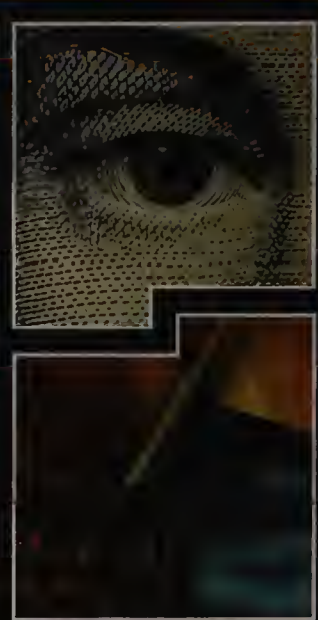
Scanning Samples

Our original photos stressed line detail and light colors (top) and rich colors, highlights, and shadows (bottom). Each scanner mistook our turquoise for blue.

Hewlett-Packard's ScanJet 4P consistently reproduced photos and line art most accurately. Aside from a faint greenish tint, all scans were sharp and bright.

Microtek's ScanMaker E3 scanned the top photo as well as the HP did, but in line-art mode the scan turned nearly black. The bottom scan is very good, but colors are too dense.

The Storm Technology EasyPhoto SmartPage scanned our samples too dark, but an image editor can fix this. Of all the sheetfed units, its scans were the brightest.



Umax's PageOffice Color scans were poor. The upper image is streaked with chunky pixels across the nose and cheek, and the dark scan below was beyond image editing help.

work, a flatbed is a better bet. With flatbed scanners, the original page stays put, so pictures scan more sharply than on sheetfed units. The larger scanning surface of a flatbed is also ideal for odd-size images. And most flatbeds offer optional document feeders that can automatically scan a sizable stack of paperwork.

By No Means Perfect

AFTER WEEKS OF TESTING, it became clear that no scanner is perfect. For example, only three of the eight models could pass our two-column newspaper clipping OCR test: Visioneer's PaperPort Vx, the only sheetfed device to do so; HP's ScanJet 4P; and the Umax Vista-S6E. The other devices made so many errors, we stopped counting. The lite OCR software that comes with these devices is not as accurate as full versions sold separately. Fortunately, if most of your paperwork has just one column, any of these scanners can read it.

At default settings, none of these devices scanned perfectly. Scans were darker than our originals, and colors weren't accurate. Overall, the flatbed models scanned better than the sheetfed units. The HP ScanJet 4P consistently gave us some of the better scans in all of our tests, despite a faint greenish tint. Of the sheetfed scanners, the Visioneer PaperPort Vx was tops at OCR, but it scanned photos only in gray scale. For color sheetfed scanning, opt for Storm Technology's EasyPhoto SmartPage.

Overall, flatbed scanners still scan color graphics about twice as fast as the sheetfed units—about 40 seconds versus about 60 to 90 seconds for sheetfed scanners. Scan resolution and color have the greatest effects on scan speed: You get much faster scans if you scan at lower resolutions using gray scale rather than color. More RAM doesn't help much; 16MB is plenty. In most cases, 32MB upped speeds by only 2 percent.

Storage should be a greater concern: You'll need as much disk space as you can afford. A 300-dpi 5-by-7-inch color photo averages 8.5MB, so even a 1GB hard drive can fill up fast. If you plan to scan a lot of images, invest in a removable storage device such as an Iomega Zip drive.

TIP 2

Try inserting a piece of black paper behind thin newspaper clippings. This helps minimize ghost characters from the other side of the paper.

Generally, flatbed scanners were harder to install than the sheetfed models, because most make you open up your PC and insert a SCSI card. We often ran into IRQ conflicts between the SCSI board and other installed hardware.

Warranties? Just one year for all the units reviewed here. Considering how much these scanners are targeted at the home office, it's surprising that only two vendors—HP and Logitech—offer technical support on the weekends.

For a full description of our scanner tests, visit PC World Online at http://www.pcworld.com/scanner.

SHEETFED SCANNERS

LOGITECH PAGESCAN COLOR

PRO: Scans bound pages, 400-dpi scans in gray scale, quick setup

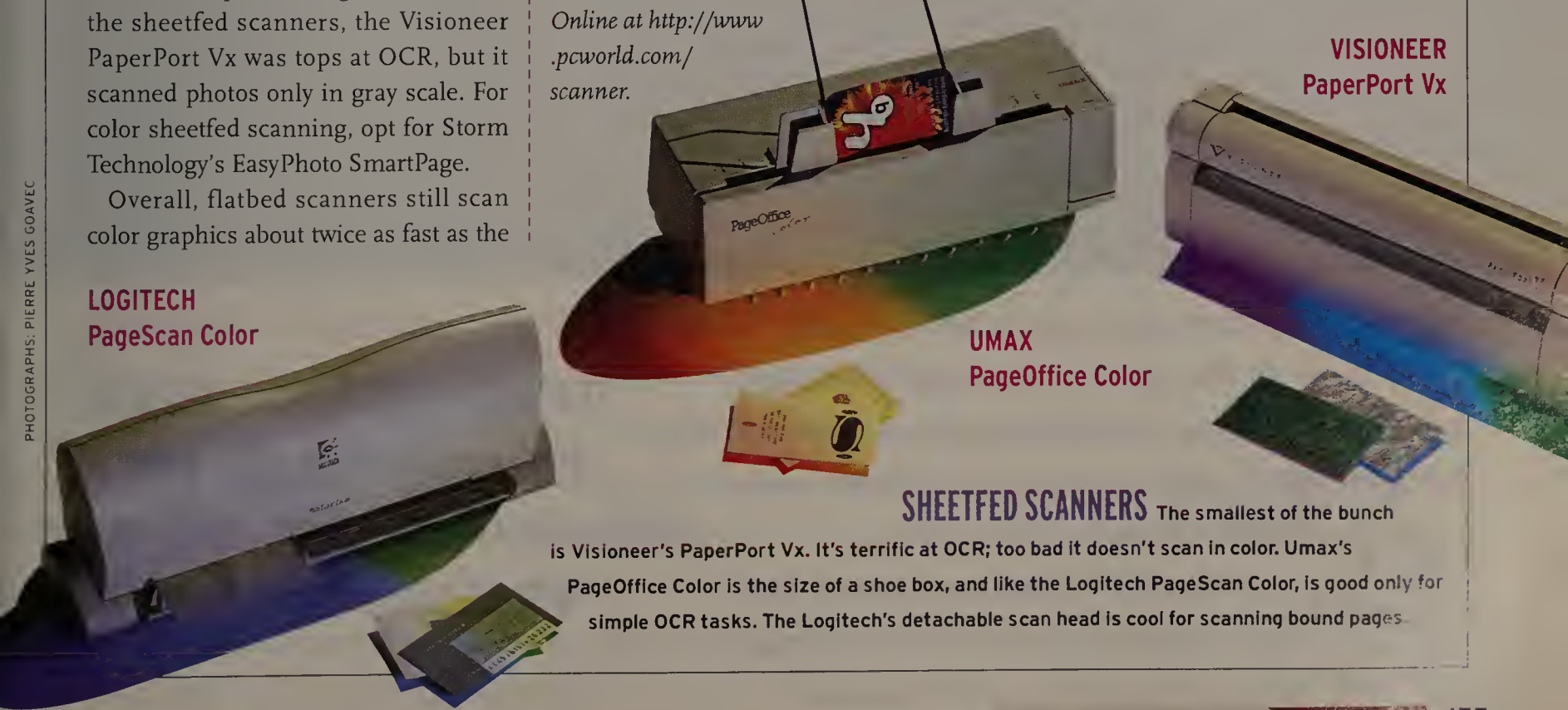
CON: Color scans are only 200 dpi, dark scan results, no-frills image editor, expensive

LOGITECH'S $399 PageScan Color is the only sheetfed unit that can scan from books. Simply detach the newspaper-size scanner from its base and place it on an open page. Rollers move the scan head briskly across the page and stop when they sense the edge of the book.

We installed the PageScan in 6 minutes—it plugs into your parallel port. The adapter is as small as a deck of cards, and on the back is a pass-through plug for your printer. However, it won't let your printer tell your PC about a paper problem unless you first adjust a few CMOS settings.

Color scans are limited to 200 dpi. That's fine for Web pages, on-screen presentations, and informal printouts. Unfortunately, every scan we got was a tad dark. We tried brightening scans beforehand using the TWAIN drivers, but without success.

The PageScan OCR module read our simple test page easily, but it couldn't decipher our two-column news clipping. The software interface kicks on when a page is fed into the scanner. You can organize scans into "drawers" and ▶



LOGITECH PageScan Color

UMAX PageOffice Color

VISIONEER PaperPort Vx

SHEETFED SCANNERS The smallest of the bunch is Visioneer's PaperPort Vx. It's terrific at OCR; too bad it doesn't scan in color. Umax's PageOffice Color is the size of a shoe box, and like the Logitech PageScan Color, is good only for simple OCR tasks. The Logitech's detachable scan head is cool for scanning bound pages.

PHOTOGRAPHS: PIERRE YVES GOAVEC

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Circle 180 on reader service card

DESKTOP SCANNERS — STANDARD FEATURES

SHEETFED SCANNERS	Street price (9/1/96)	Optical resolution (horizontal x vertical dpi)	Maximum paper length (inches)	Scanner width x depth x height (inches)	Connectivity
Logitech PageScan Color	$399	400 x 400 [1]	30	12 x 3 x 4.25	parallel port
Storm Technology EasyPhoto SmartPage*	$299	300 x 300	14	11.3 x 4.3 x 5	SCSI adapter
Umax PageOffice Color	$249	300 x 600	14	11.3 x 4.3 x 5	parallel port
Visioneer PaperPort Vx [2]	$299	400 x 200	30	12 x 2.5 x 3.8	serial port [3]
FLATBED SCANNERS					
Hewlett-Packard ScanJet 4P*	$499	300 x 600	14	15 x 23 x 5	SCSI adapter
Microtek ScanMaker E3	$349	300 x 600	13.5	14 x 19.1 x 4.7	SCSI adapter
Plustek OpticPro 4800P	$369	600 x 300	11	11.7 x 16.7 x 3	parallel port
Umax Vista-S6E	$399	300 x 600	11.7	13.4 x 21 x 5.8	SCSI adapter

*Best Buy ● Yes ○ No [1] 200 x 200 dpi in color. [2] Gray scale only. [3] Optional parallel port adapter costs $8. No support for bidirectional printing.

stack them together. For example, to copy several pages, simply drag a page stack onto the copier icon, and then pull the sheets from your printer. For simple OCR and scanning books, this is a handy tool. But for $100 less, the Best Buy Storm Technology EasyPhoto SmartPage delivers better color scans. *Logitech, 800/231-7717, http://www.logitech.com*

READER SERVICE NO. 715

STORM TECHNOLOGY EASYPHOTO SMARTPAGE

PRO: Intuitive interface, sharp color scans, fast, built-in page holder, draws power right from PC

CON: Must install adapter card in PC, large footprint for a sheetfed scanner

FOR QUICK COLOR scanning, this unit delivered the best scans of any sheetfed device reviewed here. Graphics are sharp and colors are close to the original. Its high-quality scans and intuitive software interface earn this 300-dpi scanner a Best Buy. Literally the size of a bread box, the $299 EasyPhoto SmartPage is designed to sit on a side table, not behind your keyboard like the Logitech or Visioneer. The built-in paper guide on top holds ten sheets, but we stuffed in four more pages without a snag.

Setup was easy, even though this is the only sheetfed model here that makes you install a card. During setup, an AVI video clip walks you through the process. We removed the PC cover, popped in the card, put the case back on, and installed the software, all within 12 minutes. And unlike other scanners, this one draws power directly from your PC's power supply through the card—no need to plug an AC adapter into your power strip. Prior to each scan, the TWAIN software shows a preview, but you have to reinsert the photo in the top of the scanner to make the final scan. Not too elegant.

Each scan appears as a thumbnail inside EasyPhoto's filmstrip interface. For example, to remove scratches or red eye, simply drag a scan from the filmstrip into the EasyPhoto image editor and have at it. By default, images are saved as JPEG files, but you can also save them in BMP format.

The scanner comes with Xerox TextBridge OCR Lite. Our simple press release resulted in only four word errors, but the two-column OCR test page proved too difficult. Despite that, the EasyPhoto SmartPage was the only sheetfed unit to deliver sharp, usable color scans. *Storm Technology, Inc., 888/438-3279, http://www.easyphoto.com*

READER SERVICE NO. 716

UMAX PAGEOFFICE COLOR

PRO: Low price for color scanning, feeder holds 15 pages, comprehensive scanner controls

CON: Scans too dark, small paper guides, paper ejects onto desktop, large footprint

THE OLD UMAX PageOffice sheetfed scanner scanned only in gray scale, and you had to wedge a SCSI card into your PC. This new $249 version—the PageOffice Color—hooks up to your parallel port and has a plug on the back for your printer. Setup took 20 minutes. We had to adjust the CMOS setting so our printer and PC could communicate.

TIP 3

For a professional look on all your correspondence, scan your logo into your PC so you can use it whenever you want in letters or other business documents.

Unfortunately, dark scans were a persistent problem. The PageOffice did okay on simple OCR tests, but it spit out gibberish with our two-column newspaper clipping.

The scanner's design is a mixed bag. The PageOffice's paper feeder holds 15 pages—more than any other sheetfed scanner here. The paper guides adjust to almost any page size, but these are small tabs that can easily get lost. We also didn't like how paper is dumped back onto your desk, bumping into coffee cups and other work debris.

Umax bundles decent software with its scanner. Adobe PhotoDeluxe 1.0 makes fixing images fun, while Presto PageManager integrates daily tasks such as e-mail, faxing, and editing. All in all, the PageOffice Color is tempting, but color scan quality just isn't up to snuff. *Umax Technologies, Inc., 800/562-0311, http://www.umax.com*

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PHOTOGRAPHY: PIERRE YVES GOAVEC

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SOFTWARE			SERVICE AND SUPPORT			
Image editor	Optical character recognition	Other	Warranty (years)	30-day money-back guarantee	Toll-free technical support	Weekday/weekend support (hours)
PageScan Image Editor	Xerox TextBridge OCR Lite	copier utility	1	○	●	24/24
EasyPhoto 2.2	Xerox TextBridge OCR Lite	○	1	●	●	10/0
Adobe PhotoDeluxe 1.0	Presto PageManager	form editing	1	○	●	10.5/0
○[4]	Caere OmniPage LE 4.0	copier utility, form editing, business card reader	1	●	○	11/0
Corel PhotoPaint 5 Select	Caere OmniPage LE 4.0	copier utility	1	○	○	18/7
Ulead PhotoImpact SE 3.0	Caere OmniPage LE 4.0	copier utility	1	●	○	10/0
CPI Image-In	Recognita OCR	copier utility	1	●	●	8.5/0
Adobe PhotoDeluxe 1.0	Presto PageManager	form editing	1	○	●	10.5/0

[4] Links to popular graphics programs.

VISIONEER PAPERPORT VX

PRO: Small size, intuitive interface, sharp gray scale and line art, accurate OCR with multi-column documents

CON: Does not scan in color, flimsy paper path flap, massive AC adapter

FOR FREQUENT OCR chores, the $299 Visioneer PaperPort Vx is tops. Place a page in the lip of this scanner and it gobbles it up. You can scan paperwork up to 30 inches long. The PaperPort is about the size of a rolled-up newspaper and fits behind your keyboard. If you're really cramped for space, check out keyboard scanners from Compaq, Hewlett-Packard, and Visioneer, which build the PaperPort Vx into a keyboard—right behind the function keys.

Installing the PaperPort Vx took 6 minutes. By default, it plugs into your computer's serial port. If all your ports are filled, Visioneer will send you a parallel port adapter for $8. One consideration is that the AC adapter hogs two sockets. If you're short on power strip space, that's a problem. To streamline paper flow, you can redirect the paper path by moving a somewhat flimsy plastic flap on the top of the scanner. You can make the paper feed in front and exit either out the back or up top.

The PaperPort's interface comes to life when a page is inserted into the scanner—HP bundles this Visioneer interface with its ScanJet scanner. A row of icons at the bottom of the screen connects the scanner to your modem, printer, word processor, spreadsheet, or up to 130 popular programs including Excel, cc:Mail, and Photoshop. To edit a scanned article, for instance, simply drag the file onto the Word icon, and go for it. You can also stack scans together, store them in folders, jot down notes, highlight items, and find scans by keywords.

The PaperPort's forte is OCR. It was the only sheetfed unit to pass all our OCR tests ▶

PLUSTEK OpticPro 4800P

MICROTEK ScanMaker E3

UMAX Vista-S6E

FLATBED SCANNERS For graphics tasks, you're better off choosing a flatbed model. The Microtek ScanMaker E3 delivers bright scans with vivid colors. The Plustek OpticPro 4800P isn't as bulky as most flatbeds—it's about the size of a phone book—and it can scan up to 600 dpi, versus 300 dpi for the other flatbed models. Unfortunately, the Plustek's scans were too dark. The Umax Vista-S6E offers better-quality scans that were almost as crisp as those from the Microtek and HP.

Speed Reading From HP, Umax, and Visioneer

SHEETFED SCANNERS	ONE-COLUMN			TWO-COLUMN		
	Speed (seconds)	Average word errors	Accuracy	Speed (seconds)	Average word errors	Accuracy
Logitech PageScan Color	24	4	98.7%	78	unacceptable	–
Storm Technology EasyPhoto SmartPage*	25	4	98.7%	62	unacceptable	–
Umax PageOffice Color	24	7	97.8%	87	unacceptable	–
Visioneer PaperPort Vx	18	4	98.7%	34	31	94.6%
FLATBED SCANNERS						
HP ScanJet 4P (with 4C drivers)*	30	5	98.3%	34	20	96.4%
Microtek ScanMaker E3	24	7	97.7%	36	unacceptable	–
Plustek OpticPro 4800P	20	6	98.1%	82	unacceptable	–
Umax Vista-S6E	21	5	98.4%	39	45	92.1%

* Best Buy

HOW WE TEST We tested each scanner on a pair of Hewlett-Packard Pentium-133 PCs. Test results for 16MB system are shown here; test results for 32MB system are within 2% of 16MB results. We cleared the hard drive on our test PCs each time we installed a scanner. We fed each scanner two test pages: a simple, 286-word single-column press release without graphics, and a complex, 566-word two-column newspaper clipping. We measured the time it took the OCR software to recognize the document after scanning. We scanned each document three times on each test PC, then averaged the word errors to get final results. Over 50 word errors was judged unacceptable.

without lots of errors. If OCR is your top priority, this gray-scale scanner is a smart choice. *Visioneer Inc., 800/782-7007, http://www.visioneer.com*

READER SERVICE NO. 718

FLATBED SCANNERS

HEWLETT-PACKARD SCANJET 4P

PRO: Best OCR, great for scanning photographs, good software bundle, technical support available Saturdays

CON: Faint green tint on scans, must download 4C drivers to perform 300-dpi scans, expensive

THE $499 HEWLETT-PACKARD ScanJet 4P is your best bet for any OCR or imaging task. Scan quality is superb, aside from an ever-so-faint green tint that took just seconds to remove. It was also the most accurate scanner in this review for OCR. HP borrows Visioneer's software interface so you can link your business applications, create copies with your printer, and enhance images using the bundled Corel PhotoPaint 5 Select.

This scanner isn't perfect. Installing the 300-dpi flatbed was easy, but we discovered that the 4P's software drivers limit all but line-art scans to 200 dpi. To scan in color or gray scale at 300 dpi, HP says you must first download drivers for the ScanJet 4C for free from HP's Web site.

Equipped with the 4C drivers, the HP 4P's scans were so sharp that we could see tiny rivets on a billboard in our Times Square test photo. And for really heavy OCR workloads, HP has a document feeder for a hefty $559—more than the cost of the scanner itself. We were able to put 50 pages into the feeder, go around the corner and grab a coffee, and return half an hour later to a pile of scanned paperwork.

All told, although this flatbed scanner is expensive, and you'll need to download better drivers, it should be your first choice if accurate image quality and OCR are top priorities. HP's ScanJet 4P is the only scanner in this review that can handle any OCR or graphics job you give it. *Hewlett-Packard Co., 800/722-6538, http://www.hp.com*

READER SERVICE NO. 719

MICROTEK SCANMAKER E3

PRO: Accurate color and gray-scale scans, good image editor, lowest-price flatbed model here

CON: Poor OCR and line art, big footprint, tricky SCSI card installation, short adapter cable

FOR COLOR AND GRAY-SCALE scanning, the $349 Microtek ScanMaker E3 is a real bargain. This color scanner produced imagery that came close to the quality of the original. By comparison, the Best Buy HP ScanJet 4P was a close second to Microtek in areas of color accuracy and contrast and brightness.

Unfortunately, business users hoping to digitize important paperwork using OCR will be disappointed. For multicolumn projects, you're better off typing in the text yourself. Also, the ScanMaker E3's scan surface is only 13.5 inches long, so it clipped half an inch off our long newspaper column. Not good.

Installation wasn't a piece of cake either. The video inside the box makes setup look easy, but after 45 minutes we gave up and called Microtek's tech support line. The technician asked a few questions, had us flip three switches on the SCSI card, and we were in business.

Microtek's TWAIN drivers prescan each image so you can make adjustments before scanning. If the picture isn't perfect, never fear: The ScanMaker E3 comes with a good image editor, Ulead PhotoImpact SE. All in all, the ScanMaker E3 is a great flatbed scanner for graphics, but poor OCR accuracy and cumbersome installation were setbacks. *Microtek Lab, Inc., 800/654-4160, http://www.microtekusa.com*

READER SERVICE NO. 720

PLUSTEK OPTICPRO 4800P

PRO: Small footprint for a flatbed, 6-minute setup, up to 600-dpi optical resolution

CON: Scans dark, poor OCR, short scan surface

THE $369 OPTICPRO 4800P is a ▶

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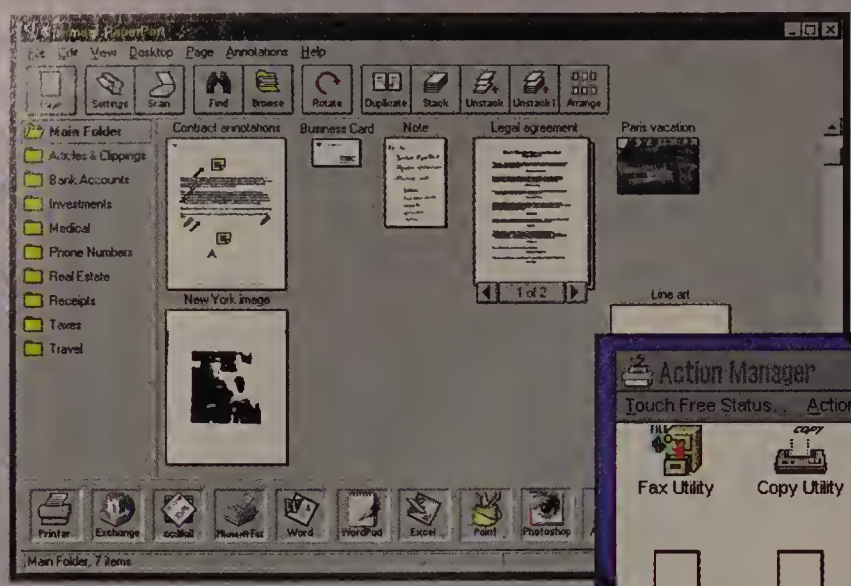

A good scanner software interface makes it easy to keep tabs on scans and link the device to programs you use often. For example, the Visioneer and HP (left) use a desktop metaphor where you can organize documents into folders, attach notes, or drag scan thumbnails onto any program icon you've linked to perform a specific task. A less fancy scanner interface, such as Plustek's (right), manages program links—called Actions—not the scans you've made.

cross between a sheetfed and a flatbed scanner It's the size of a phone book, and hooks up to your parallel port like a sheetfed unit. Best of all, it can scan at up to 600 dpi. That optical resolution gives you the best close-up detail of any scanner here.

What's the catch? Plustek's scanner gave us the darkest images of all the flatbed models we tested. Its Recognita OCR software botched our tests, and the short 11-inch scan surface cut the bottom off our long newspaper article.

It's easy to link software you already use with the scanner interface. Each link is called an Action. To send a fax, make a copy, or zip off an e-mail message, place the page on the scanning surface, and click an Action icon to perform the task. All told, the high resolution and small footprint of the Plustek OpticPro 4800P are pluses, but the consistently dark scans and poor OCR deflated the high hopes we had for this pint-size flatbed scanner. *Plustek, Inc., 800/685-8088, http://www.plustek .com*

READER SERVICE NO. 721

TIP 4

Want to tilt a picture for a Web page or print layout? Instead of doing it with software, scan the picture at an angle. The results will look crisper and cleaner.

UMAX VISTA-S6E

PRO: Speedy scans, good OCR on complex documents, good software bundle

CON: Scans a tad dark, small scanning surface for a bulky flatbed

THE $399 UMAX Vista-S6E took only 12 minutes to install, and it performs quickly. In its haste, though, the Umax unfortunately gave us scanned images that were a tad too dark and not quite as sharp as scans produced by the Microtek or HP scanners. We could easily salvage images using the bundled Adobe PhotoDeluxe 1.0 image editor, but scan quality was still third-rate for a flatbed.

We had to tweak TWAIN scanner settings for half an hour before we could get a decent image that could be used for on-screen projects such as a Web page or presentation. One thing we did like about both of the Umax scanners was the software bundle—particularly Adobe's PhotoDeluxe, which walks you through everything from scanning in images to touching up photos and adding effects. For business chores, the Presto PageManager suite let us drag and drop stacks of scans into any application that we linked to the scanner. The interface is easy to use: For example, to fax a page, just drop a file on the fax machine icon. Type the number, and the fax is sent through your modem. Presto's OCR module also recognized our difficult two-column newspaper clipping. It took less than 3 minutes to correct the typos.

Setup is simple, performance is fast, OCR accuracy is good, and the software bundle is excellent, but in the end we expected better picture quality from this flatbed scanner. *Umax Technologies, Inc., 800/562-0311, http://www.umax.com*

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Dean Andrews is a freelance writer based in San Francisco.

For more information about all products in this article, circle reader service no. 909. ■

Introducing the 56K download
over analog phone lines.

Introducing the next generation
of Internet access.

Introducing the new standard
for online speed.

Introducing x2™ Technology from

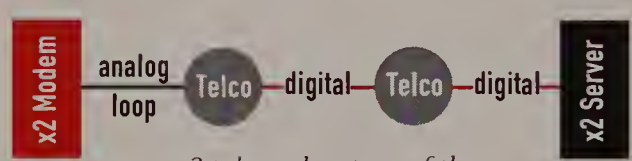
U.S. Robotics®

56K. It's not just a new kind of modem. It's a new

The Biggest Breakthrough In Online Communications

For years, 33.6K was thought to be the practical transmission speed limit over analog phone lines. Not any more. New x2™ technology from U.S. Robotics shatters this barrier. Now you can get up to 56K of actual transmission speed when you download.

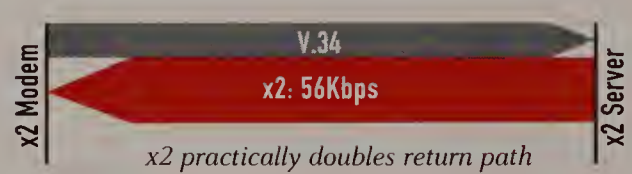
This revolutionary breakthrough is brought to you by the advanced team of engineers at U.S. Robotics. Their knowledge of the increasingly digital telephone system makes x2 possible. x2 takes advantage of the typical network configuration found when an analog subscriber connects to a digitally connected server. Because it bypasses the analog-to-digital conversion in the downstream path, x2 can use nearly all of the available 64K network bandwidth.



x2 takes advantage of the highly digital phone network.

(Upstream data, typically less speed sensitive, travels at the standard V.34 rate.)

The result is a completely new kind of transmission technique. Based on "encoding" rather than "modulation," it can give you download speeds that you never thought possible. What's more, with standard V.42 *bis* compression, x2 can download at speeds up to a blistering 230.4K.



x2 practically doubles return path

Whether you're surfing the net, telecommuting from home, or accessing information from a mobile location, x2 can help you get what you want, when you want it.

Only U.S. Robotics Can Bring You x2 Technology

U.S. Robotics is uniquely positioned to bring you this breakthrough. We are the #1 provider of information access solutions in the world today. That's because our communications products are favored on both the server and end-user sides. This is important, since a communication technology must be in place on both ends of the connection to work properly for you.

Connecting More People Than Anyone Else In The World

U.S. Robotics Total Control™ Enterprise Network Hubs are widely used by Internet service providers, corporate sites, and online services. Our Megahertz® brand is the leading choice for mobile users. And more people choose Sportster® modems than any other desktop brand. All told, no company puts more communication power into the hands of more people throughout the world than U.S. Robotics.

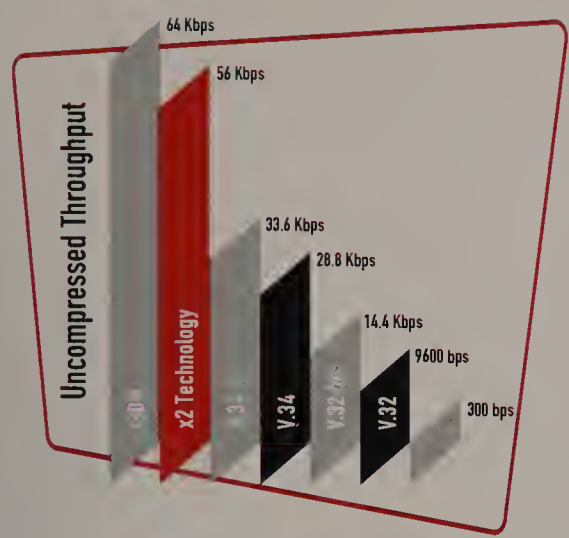
x2 technology is being supported by over 30 industry leaders worldwide. These include:

AMERICA Online

CompuServe

IBM

MCI



Comparison of actual line throughput speeds.

Creating The Next Worldwide Standard

As the first company to bring you 14.4K, 28.8K/V.34, and 33.6K technology, U.S. Robotics is the leader in blazing the trail toward faster standards. In fact, we've already submitted x2 to the ITU-T board, and expect it to become the standard of the future.

But greater speed is in demand right now. And, because x2 was designed to work with existing V.34 standards, we're able to bring it to you.

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Sportster, the world's #1 selling modem, is now shipping in an easily upgradable version, and has been since August 1996.

Our Total Control™, NETServer, MP, and Courier™ products are flash ROM upgradable, with no extra equipment to buy.

And our Megahertz© PC Cards will be x2-capable beginning in early 1997.

Whatever your needs, you know they'll be met at incredible speed–and a reasonable price–whenever you see the x2 logo.

kind of technology.

Supported By Major Internet Service Providers

America Online, CompuServe, and MCI are just some of the more than 30 ISPs worldwide that are implementing x2™ in their access servers. With such overwhelming support, x2 will become the technology of choice for anyone who wants the very fastest in online connections.

Simply check our website to find out if your ISP supports x2 technology, or contact them directly.

Adopted By Industry Leaders

x2 has been embraced by every sector of the communications industry, including major retailers, chipset makers, and original equipment manufacturers. This widespread acceptance ensures that x2 will be available to you on a variety of platforms, both now and in the future.

U.S. Robotics features a complete line of x2-capable products.

NETCOM™

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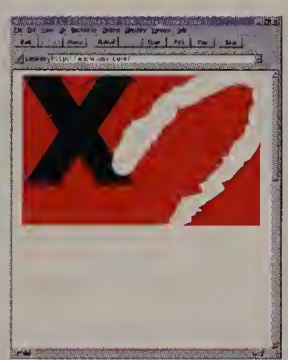
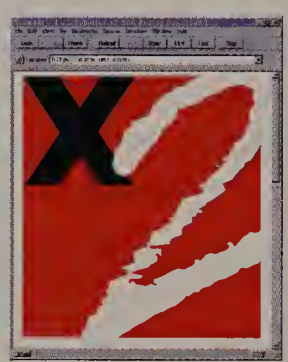
TEXAS INSTRUMENTS

The breakthrough you don't have to wait for.

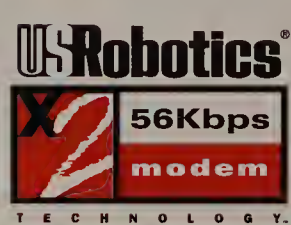
A graphic download at 14.4K speed.



In the same amount of time, a 28.8K modem downloads this much.



While x2 Technology's 56K speed gives you the whole picture.



Faster Downloads From The Internet

While x2™ is ideal for any online application, you'll really notice the increased speed when accessing graphics-heavy web pages or high bandwidth audio and video files.

x2 can cut the time you spend waiting for downloads nearly in half. You'll spend more time surfing, and less time waiting.

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Until now, 64K ISDN (*Integrated Services Digital Network*) lines were the only way to get downloads this fast. But ISDN lines are expensive to install and maintain.

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As the new standard for online speed, x2 technology gives you the access solution that's right for today's needs, and ready for tomorrow's innovations. To learn more about how x2 can save you time, call us toll free at 1-800-525-USR1 or visit us at www.usr.com/x2.

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Call us toll free: Desktop users dial 1-800 DIAL USR. Corporate customers dial 1-800 USR CORP. Mobile users dial 1-800 LAPTOPS. U.S. Robotics 7770 Frontage Road Skokie, Illinois 60077, www.usr.com/x2.

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PC WORLD

TOP 100

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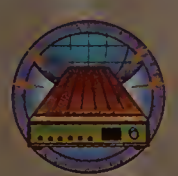
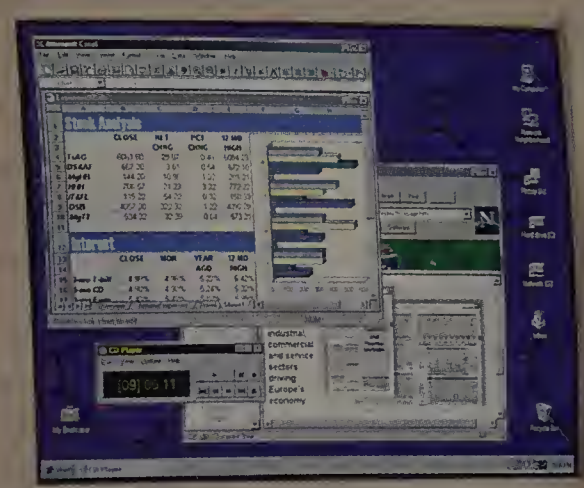
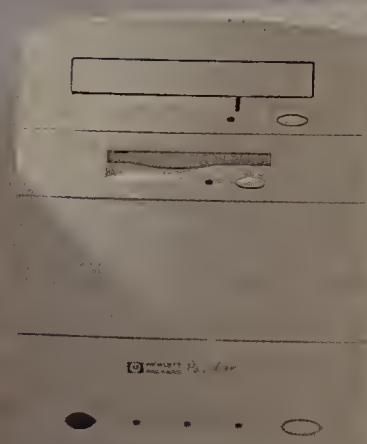


Home PCs mean Business





HP'S PAVILION 7285: A home PC you wouldn't mind taking to the office.

PCs ARE GETTING BETTER at playing both the home appliance and the office tool. Several companies are making PCs more attractive with designer colors and more comely shapes, offering better multimedia monitors, and even integrating classic domestic devices such as the radio and the TV.

At the same time, we're finding these home PCs to be as powerful as most of the traditional office PCs we've tested. The biggest

BY BRYAN HASTINGS

difference is that you may have to pay up to a $500 premium for them.

This month we looked at four of the latest PCs designed to appeal especially to home users: Hewlett-Packard's Pavilion 7285, Packard-Bell's Platinum 65, Sony's PCV-90, and Toshiba's Infinia 7200. All are Pentium-200 systems, and all performed near or on par with a typical office PC of the same CPU.

Including a TV on a PC can be helpful for catching the news or other late-breaking information while you're working. But there are trade offs to the PC/TV arrangement. On the Toshiba Infinia, you take a noticeable performance hit to watch TV; informal tests showed that this Pentium-200 acted more like a P-75 when large spreadsheets were opened while the small (8-inch) TV screen was active. Also, the $3548 Infinia is expensive for a P-200; you can save several hundred dollars by buying a more price-competitive P-200 and a separate TV set. All that said, the Infinia is the best multifunction PC we've seen so far. In addition to TV, it has AM/FM radio, a CD player, and a telephone answering machine, all controlled from a front-panel command center and a remote unit. Packard-Bell's Platinum also came with a TV tuner. All these home computers came with 28.8- or 33.6-kilobits-per-second modems.

HOME RUN? Sony's PCV-90 has good looks and a multimedia monitor.

A multimedia monitor can be a real plus for the home or a private office, considering the growing use of video and audio on the Internet. The PCV-90 and Infinia multimedia monitors are some of the best we've encountered. With a pair of tweeters and midrange speakers mounted on the sides and subwoofers embedded into their bases, these monitors provide surprisingly full-bodied sound. They still remind us more of boom boxes than Bang and Olufson speakers, but the quality is a long way from the muffled squawk long associated with PCs.

HP's $3560 Pavilion 7285, number nine on our Power Desktops chart, was the only home PC of the four to make the Top 20 chart. Its home-oriented features include a voice modem so you can set up the PC to take phone messages, and an alternate desktop interface called "Personal Page" that lets you separate the pro-

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them. If not, ask us; see page 12 for contact information.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. Every month we test the latest products in each category and compare them to the pool of items we've already reviewed. As new products earn places on the charts, those at the bottom drop off. Price cuts also cause chart changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? It's the sum of all our tests—both hands-on evaluations and automated speed tests. The scale is 1 to 100, so a product that scores in the 90s is generally considered exceptional, one in the 80s is among the best, one in the 70s is above average, and one that scores lower usually doesn't place.

What does the PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Dell P75t configured with 8MB of RAM, a 540MB hard drive, and no secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline unit.

Where do the reliability and service and support scores for PCs come from? The reliability score and the "service" portion of the service and support score come from readers who respond to the Reliability and Service fax-back survey in each issue of *PC World*. The "support" portion of the service and support score is based on the vendor's support policies (such as length of warranty and support hours).

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For example, a budget PC that is rated "expensive" is high-priced only in relation to other budget PCs. Likewise, a power notebook rated "good" for performance is good only in relation to other power notebooks. Word scores for other categories, such as features, are relative to all desktops or all notebooks.

Where can I find the online version of the Top 100? Go to PC World Online (http://www.pcworld.com). There you'll find not only the current issue of *PC World* and reviews for the last 18 months, but some extra features you'll want to check out. For one thing, PC World Online includes reviews you won't find in print. If a product misses a chart and we don't cover it here, you can go directly to an online review by using the URL provided in each Top 100 section.

Have you ever wished you could build your own chart based on your buying criteria? Now you can, with Personal Shopper at our Web site. Personal Shopper combines your criteria with *PC World*'s current data and test results to generate customized Top 20s and Top 10s. For instance, if you want your chart to rank notebooks that have 120-MHz processors and 28.8-kbps modems, Personal Shopper will find and rank all the machines that fit your specifications.

grams that you and your kids use, and to restrict access to your programs. Yet the Pavilion fits the corporate bill with a generous feature set, including an extra-large 3.2GB hard disk and round-the-clock tech support hours, and its PC WorldBench score of 207 puts it ahead of most P-200 desktops for home or office. The Pavilion is pricey, but according to our survey, HP systems are rock-solid reliable.

You can read about the Infinia, Platinum, and PCV-90 on PC World Online (http://www.pcworld.com/t20snaps).

WHAT'S NEW ON THE CHARTS

TWO NEW DELL AND MICRON systems jockeyed for the top Power Desktops spot, with Micron's Millennia P166 edging out the Dimension XPS Pro200n. The Micron P166 system is the Dell Pro-200n's equal in all but performance, where it trails Dell's machine by over 20 PC WorldBench points. But the P166 is also more than $1000 cheaper than the Pro200n. Quantex's new QP5/200 M-4 Pentium Pro-200 minitower (number 11 on the Power Desktops chart) is faster than any PC we've tested except the Pentium Pro-200 PCs from Gateway 2000 and Sys Technology.

On the Budget Desktops chart, Micron hit the top Best Buy spot with a new Millennia P133. We reviewed this model last March, but Micron has upgraded the BIOS since then, so we retested the latest unit. This is an $1899 PC that performs like a P-166 and has a terrific graphics subsystem. Another P-133 unit that made our Best Buy ranks is Compaq's Presario 4402. It has no free bays and only two free expansion slots, and Compaq charges for tech support after a year, but if you can live with this, you might want to consider this highly reliable, reasonably priced system.

The only new Top 20 notebook this month is Gateway 2000's Solo 2100 P-133, hitting third on the Power chart. The $4599 price is a bit steep, but it's the fastest notebook we've tested. This Solo's PC WorldBench score of 186 puts it in the league of Pentium-133 desktops. That, plus a great feature set, puts the Solo on the chart, even with reader qualms about service and support. Meanwhile, WinBook just discontinued its XP5 line of notebooks, causing a Power and a Budget contender to drop from the charts.

WHAT'S HAPPENING WITH PERIPHERALS

WE REVISIT 17-INCH monitors for the first time since September; the Iiyama Vision Master Pro 17 is our top choice. It offers the best graphics images we've seen yet, and it does a great job on text, too. Check out our Top 10 Monitors chart.

High-end graphics cards are getting more affordable. The 3D Xpression+ PC2TV, ATI's revamp of one of its most popular cards, hits the number one Top 10 Graphics Boards slot this month, and it's the first 4MB-equipped unit we've seen for under $200. This amount of RAM also offers "true-color" (16.8 million colors) images at 1024 by 768 resolution. You get images with a richness of detail and hue that will take your breath away.

From the looks of the Top 10 Modems chart, 33.6 kbps is fast becoming the norm. ISDN it ain't, but when it comes to Web browsing, you should take every kilobit per second you can get. If you're shopping for a workgroup printer, check out the latest lineup in the Top 10 Printers roundup. Tektronix's new $3495 Phaser 350 bridges the price-quality-speed chasm between ink jets and lasers with a unit that uses solid ink technology. It's a bit lame when it comes to text—small-point text is fuzzy—but it produces gorgeous images comparable to many color lasers, and it can crank them out faster than nearly all the color printers we've tested.

Bryan Hastings is a senior associate editor for PC World. *Assistant Editor Allyson Bates, Staff Editors John Goddard and Eric Hellweg, Senior Associate Editors Brad Grimes and Harry McCracken, Associate Editor Melissa Riofrio, and freelance writers Jon Jacobi and Jim Martin contributed to the Top 100. Testing for the Top 100 by Dave Casini, Ulrike Diehlmann, Jeffrey Kuta, Kevin Mitchell, Susan Silvius, and Mike Salayko.* *See page 12 for contact information.*

NEW YEAR'S RESOLUTIONS

THERE'S NO REST for the weary PC shopper. You've just gotten used to Windows 95 and sorted out the many flavors of Pentium chips. Now Microsoft and Intel want to make this the year of the Pentium Pro PC and possibly even Windows NT. Meanwhile, the Internet is reaching out and touching everybody, and demanding more bandwidth while it's at it.

So plan for the future, or at least for this year. Keep your chin up, and make these three resolutions:

1 Buy more memory now. If you don't already have at least 16MB of RAM, hie thee to the nearest memory store—prices are going up. Windows 3.*x* ran pretty well with 8MB of RAM, but using a Windows 95 PC with less than 16MB can be like trying to spur along an old nag. And if you're even thinking of moving to Windows NT 4.0, make that 32MB.

2 Get the largest hard disk you can afford. Industry pundits have a rule of thumb: You need twice the hard disk space you needed last year. This year we see every indication that hard drives 2GB or larger will be the minimum. The Internet is rife with disk-ravenous multimedia content that needs huge amounts of space, and software developers continue their never-ending quest to add more features. With space costing around 12 cents per megabyte and dropping, getting the largest hard disk you can is worthwhile.

3 Upgrade your modem to 28.8 or 33.6 kilobits per second. It's no longer a question whether you should get on the Internet, but when. Do yourself a favor and get the fastest modem available—even these can cost under $100. Even at 28.8 or 33.6 , the Net can be sluggish, but at anything less, you're playing with your sanity.

ILLUSTRATION: JOHN BLECK

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (10/15/96)	CPU	Comments
1	Micron Millennia P166 800/223-6571 www.micron.com	–	NEW	$2708	Pentium-166	Revamp is very fast for a P-166; excellent graphics; as reliable as they come.
2	Dell Dimension XPS Pro200n 800/388-8542 www.dell.com	–	NEW	$3738	Pentium Pro-200	Updated unit has great speed, easy-open case, clean design, top reliability.
3	Dell OptiPlex GXpro 200 800/388-8542 www.dell.com	2	Aug 96	$3702	Pentium Pro-200	Fast corporate PC, modular design, built-in networking.
4	Micron Millennia Pro200 Plus 800/223-6571 www.micron.com	7	Dec 96	$3708	Pentium Pro-200	$999 price cut on PC with Iomega Jaz drive; P-166 version also good.
5	Dell Dimension XPS P200s 800/388-8542 www.dell.com	3	Sept 96	$2999	Pentium-200	Hot graphics card is a plus; fast PC, but not faster than EDO DRAM systems.
6	Dell OptiPlex GXMT 5200 800/388-8542 www.dell.com	5	Sept 96	$3771	Pentium-200	Fast; uncommonly good deal on a network-ready PC.
7	Gateway 2000 G6-200 800/846-2000 www.gw2K.com	8	Dec 96	$2879	Pentium Pro-200	Very fast; SCSI storage; ample expandability; good as a workgroup server.
8	Compaq Deskpro 2000 Model 5200/1080 800/345-1518 www.compaq.com	6	Nov 96	$3218	Pentium-200	No sound, but great performance, high reliability rating, and clean design.
9	HP Pavilion 7285 800/752-0900 www.hp.com	–	NEW	$3560	Pentium-200	Fast; large hard disk; voice modem; warranty is for only one year.
10	Cyrix 6x86 P200 800/340-7501 www.cyrix.com	9	Nov 96	$3839	Cx6x86-P200+	Competes well with mostly slower P-200s; biggest hard drive on chart.
11	Quantex QP5/200 M-4 800/896-4898 www.quantex.com	–	NEW	$2569	Pentium Pro-200	Great speed; needs better reliability.
12	HP Vectra 500 Model 515MCx 5/166 800/752-0900 www.hp.com	12	July 96	$2754	Pentium-166	Small-business PC with voice mail; its reliability is hard to beat.
13	HP Vectra VL4 5/200MT 800/752-0900 www.hp.com	11	Sept 96	$3183	Pentium-200	Well-built PC; P-166 version is also good.
14	Sys Technology Performance Pro 200 800/613-9963 www.systechnology.com	17	Dec 96	$2949	Pentium Pro-200	Fastest PC to date; good graphics card, but otherwise generic components.
15	Netis N6200PCI 800/577-7526 www.netistech.com	18	Dec 96	$3028	Pentium Pro-200	Enormous tower PC can take two CPUs; it's fast and cheap for a PPro-200.
16	IBM PC 350 P200 800/426-2968 www.pc.ibm.com	15	Sept 96	$3903	Pentium-200	Great network PC includes Universal Serial Bus ports; a bit expensive.
17	ZDS Z-Station GT 500 800/582-0524 www.zds.com	16	Sept 96	$3570	Pentium-200	Fast and well put together, except for the add-in cards—they're upside down.
18	Tangent TC6200 800/800-5550 www.tangent.com	19	Dec 96	$2795	Pentium Pro-200	Fast; inexpensive for a PPro-200; can be set up as minitower or desktop PC.
19	Acma zPower Pro 200 800/786-6888 www.acma.com	–	NEW	$3395	Pentium Pro-200	Speedy and has great graphics and multimedia.
20	DTK Quin-55M/P200 800/289-2385 www.dtk.com	–	Dec 96	$2550	Pentium-200	Great system held back by low reliability rating.

Best Buy See features chart, page 194; performance chart, page 196. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available December 23).

THESE DAYS, Pentium-200 PCs and their Pentium Pro counterparts rule the power desktop roost. Nearly all the power systems we tested this month are Pentium-200 or Pentium Pro-200 units. Newcomer CLR has a powerful minitower that didn't miss our chart by much—though our having to leave messages for tech support in the middle of the day helped keep it off the chart. The NEC PowerMate P2200, which also fell just shy of the chart, shows what interesting and useful improvements NEC is making to documentation. For more details on the systems that didn't make the Power Desktops chart, visit PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	PC WorldBench score/performance	Vendor's system reliability	Features and design	Price	Vendor's service and support	Fax reprint number[1]	Reader service number
91	208/very good	best	outstanding	inexpensive	best	3473	645
91	230/very good	best	outstanding	average	best	3474	646
91	232/outstanding	best	outstanding	average	best	3401	647
90	230/very good	best	outstanding	average	best	3457	648
90	208/very good	best	outstanding	average	best	3415	649
89	216/very good	best	outstanding	average	best	3417	650
87	234/outstanding	fair	outstanding	average	good	3458	651
87	218/very good	best	very good	average	good	3442	652
86	207/good	best	outstanding	average	fair[2]	3475	653
86	223/very good	[3]	outstanding	expensive	[3]	3444	654
86	233/outstanding	poor	outstanding	inexpensive	fair	3476	655
85	192/good	best	outstanding	inexpensive	fair[2]	3383	656
84	201/good	best	very good	average	fair[2]	3421	657
83	236/outstanding	[3]	outstanding	average	[3]	3459	658
83	230/very good	[3]	outstanding	average	[3]	3460	659
82	215/very good	fair	outstanding	expensive	fair	3419	–
82	215/very good	good[2]	outstanding	average	[3]	3420	660
81	230/very good	[3]	outstanding	average	[3]	3461	661
80	231/outstanding	[3]	outstanding	average	[3]	3477	662
79	208/very good	poor[2]	outstanding	inexpensive	[3]	3478	663
Scorecard weightings	Performance 25 percent	Reliability 25 percent	Features 20 percent	Price 15 percent	Support 15 percent	All products:	905

[2] Limited data; score is based on responses for this company and average of all companies.
[3] Insufficient data.

This Month's Best Buys

1 MICRON MILLENNIA P166

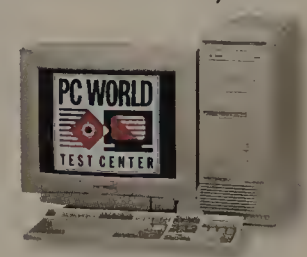
PRO: Very fast, cleanly laid out, readers give the company high service and reliability ratings

CON: None significant

Whenever we have a system that consistently places high on the charts, we completely rereview it several times during the course of its life. The latest Millennia P166 replaces the unit we reviewed last April. This nicely decked-out minitower is now our most highly recommended power desktop.

$2708 is a very reasonable price for a fast, full-featured PC. In fact, many of the more budget-minded shoppers will be able to afford it. This latest Millennia P166 scored well above the typical P-166, matching the performance of some Pentium-200 units. It's cleanly designed, well assembled, and backed by outstanding support. There's remarkably little to find fault with on this system.

People who do a lot of work with high-resolution images will have their needs met here. The Diamond Stealth 3D 2000 video card with a generous 4MB of EDO DRAM delivers true-color images at up to 1024 by 768 resolution, and the 17-inch monitor does a nice job of displaying them. The Millennia's 2.1GB hard disk should satisfy most people's needs for a while. This is a strong multimedia package, and it comes with a modem. However, the only software you get is the operating system.



Micron Millennia P166

When we looked inside the Millennia's minitower case, we found it to be exceptionally cleanly laid out and spacious. Having the sound chip integrated onto the motherboard reduces the clutter by one expansion card. We found the Millennia's documentation to be excellent.

Micron backs its hardware with an excellent support package. A three-year parts warranty, 24-hour toll-free phone support, and a free first year of on-site service are first-rate for consumer PCs. But support is more than just policies: Some companies with 24-hour-a-day, seven-day-a-week service are still impossible to get in touch with. Not so with Micron. Judging by the many faxes we've received from readers in our on-going survey, Micron does a superb job of providing service to its customers. Readers also have registered few complaints about the sturdiness and reliability of its PCs.

2 DELL DIMENSION XPS PRO200N

PRO: Very fast, extremely well appointed, great reliability, excellent support

CON: None significant

No PC is perfect. We have our nit-picks with this minitower. But in the final analysis, the XPS Pro-200n is one of the best power desktops you can buy. This $3738 machine ▶

TOP 20 POWER DESKTOPS

STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Micron Millennia P166*	Pentium-166	32	512	2.1	Diamond Stealth 3D 2000	4/EDO DRAM	17/15.8	.26	8X
2	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	3.2	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
3	Dell OptiPlex GXpro 200*	Pentium Pro-200	32	256	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
4	Micron Millennia Pro200 Plus*	Pentium Pro-200	32	256	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/16	.26	8X
5	Dell Dimension XPS P200s*	Pentium-200	16	512	2.6	Number Nine Imagine 128 Series 2	4/VRAM	17/15.3	.28	8X
6	Dell OptiPlex GXMT 5200	Pentium-200	32	512	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
7	Gateway 2000 G6-200	Pentium Pro-200	32	256	2.1	Matrox Millennium	4/WRAM	17/15.9	.25	8X
8	Compaq Deskpro 2000 Model 5200	Pentium-200	32	256	1.1	integrated Cirrus Logic 5436	2/EDO DRAM	15/14	.28	8X
9	HP Pavilion 7285	Pentium-200	32	256	3.2	S3 Virge PCI	2/EDO DRAM	17/15.5	.28	8X
10	Cyrix 6x86 P200	Cx6x86-P200+	32	256	4.1	Matrox Millennium	2/WRAM	15/14	.28	8X
11	Quantex QP5/200 M-4	Pentium Pro-200	32	256	2.6	STB Lightspeed 128	2/MDRAM	17/16.1	.25	8X
12	HP Vectra 500 Model 515MCx 5/166	Pentium-166	16	256	1.6	integrated Trio64	1/DRAM	15/13.7	.28	8X
13	HP Vectra VL4 5/200MT	Pentium-200	16	256	2.5	Matrox Millennium	2/WRAM	15/13.5	.28	8X
14	Sys Performance Pro 200	Pentium Pro-200	32	256	2.5	Matrox Millennium	2/WRAM	17/15	.28	8X
15	Netis N6200PCI	Pentium Pro-200	32	256	2.1	Matrox Millennium	2/WRAM	17/15.1	.28	6X
16	IBM PC 350 P200	Pentium-200	32	512	1.6	integrated Trio64V+	2/EDO DRAM	17/15.5	.28	6X
17	ZDS Z-Station GT 500	Pentium-200	32	256	2.6	integrated ATI-264VT	2/SGRAM	17/15.5	.26	8X
18	Tangent TC6200	Pentium Pro-200	32	256	2.1	STB Lightspeed 128	2/MDRAM	17/15.7	.27	8X
19	Acma zPower Pro 200	Pentium Pro-200	32	256	2.1	Matrox Millennium	4/WRAM	17/15.5	.28	8X
20	DTK Quin-55M/P200	Pentium-200	16	512	2.1	STB Lightspeed 128	2/MDRAM	17/16	.28	8X

* Best Buy ¹ Toll call.

replaced the Dimension unit we reviewed in August of last year, back when Pentium Pro-200 systems first appeared. This Dimension performed in typical Pentium Pro-200 fashion, cleaning the clocks of all the desktops based on other processors. The Pro200n is a top-of-the-line system through and through, from the 17-inch monitor, to multimedia with crisp true-color graphics and snappy wavetable sound, to a hard disk that can probably hold more data than your local library. It also includes a 33.6-kbps modem. If you're going to be venturing out onto the World Wide Web, you will want every bps of speed a modem can muster, and unless you go for ISDN, a 33.6-kbps modem is the fastest you can get. The Dell's $3738 price is pretty much in line for this heavily loaded unit.

The XPS Pro200n's case is based on the "s" series of Dell Dimensions. The CD-ROM drive is on top, and the power and reset buttons are located in the center of the front panel, well away from the floppy disk eject button, so users won't accidentally turn off the computer while trying to eject a floppy disk. While the engineers were at it, they made the case much easier to open. Give a thumbscrew a few turns, and off comes the side panel to reveal an impeccable interior with plenty of free slots and bays. The motherboard is arranged so that the corner with all the cable connectors sits right below the drive cage, which means you're not faced with the usual LA-freeway maze of ribbon cables crisscrossing everywhere and obstructing the slots. Our only complaint is that the system's interior needs better ventilation; the heat sink in our test machine burned our hand when we touched it, despite inclusion of a big cooling fan. More air could circulate if the hard disk weren't mounted so close to the front grille.

Dell Dimension Pro200n

Dell's support policies are among the best, and you can usually get through to technicians without waiting. System reliability ranks among the best, too, according to *PC World* readers. We get dozens of fax-back responses from Dell owners each month, and few of them complain about system problems.

		EXPANDABILITY						CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
28.8	integrated Vibra 16S	minitower	128	512	2	3/1	5	3/1	24	Sat., Sun.	CIS, WWW
33.6	Sound Blaster AWE32	minitower	128	512	2	3/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	integrated Vibra 16	desktop	512	256	3	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster AWE32	minitower	128	256	2	2/1	4	3/1	24	Sat., Sun.	CIS, WWW
28.8	integrated Vibra 16	minitower	64	512	1	3/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	integrated Vibra 16	minitower	128	512	2	3/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster 16 PnP	tower	256	256	2	3/6	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	compact	128	256	2	2/0	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	integrated Yamaha YMF 701	minitower	128	256	2	2/3	6	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	Sound Blaster AWE32	minitower	256	512	0	1/3	4	3/3	24	Sat., Sun.	BBS, WWW
33.6	Ensoniq Soundscape Vivo	minitower	256	256	2	3/3	4	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
28.8	Sound Blaster 16	minitower	128	256	4	2/1	4	1/1	16	Sat.	AOL, BBS, CIS, WWW
–	Sound Blaster 16	minitower	128	512	4	2/1	4	3/3	11 [1]	–	AOL, BBS, CIS, WWW
28.8	Sound Blaster 32 PnP	minitower	128	512	2	3/1	4	1/1	24	Sat., Sun.	WWW
33.6	Sound Blaster 16 PnP	tower	256	512	6	3/0	5	1/3	10	Sat.	BBS, WWW
–	–	desktop	192	512	4	1/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Creative Labs Vibra 16	minitower	192	512	4	4/1	5	3/3	24	–	BBS, CIS, MSN, WWW
28.8	Sound Blaster 32 PnP	desktop	1024	512	6	2/2	4	3/3	11	Sat.	BBS, WWW
28.8	Sound Blaster 16 PnP	minitower	512	256	2	1/1	4	3/1	9.5	–	BBS, WWW
–	Sound Blaster 16 PnP	minitower	128	512	2	3/3	5	2/2	9	–	WWW

3 DELL OPTIPLEX GXPRO 200

PRO: Very fast, great design, networking

CON: None significant

The $3702 GXpro is a great buy, especially as a network machine. It's a very fast, easily upgradable powerhouse designed to work well in a corporate environment. The PC comes with some multimedia components, including integrated sound and speakers, but don't count on the ultimate multimedia experience. Dell puts most of the muscle behind this Pentium Pro machine into a LAN connection and a terrific interior design that network administrators will love.

With a PC WorldBench score of 232, the OptiPlex GXpro is one of the fastest systems we've tested. The graphics hardware is top-notch—a Number Nine Imagine 128 Series 2 graphics card with 4MB of VRAM, and a bright, crisp 17-inch Dell D1728D monitor. The multimedia setup is pretty much par for the course, with an integrated Vibra 16 sound chip, Altec Lansing ACS 31 speakers, and an 8X CD-ROM drive. The PC comes ready to plug into your network with an integrated 3Com ethernet adapter.

Dell OptiPlex GXpro 200

The OptiPlex GXpro's desktop design is a vast improvement over previous systems. In fact, it's one of the easiest-to-upgrade PCs we've seen. The case is simple to remove, and the internal construction is modular. Cards are housed on a vertical riser plane that slides out at the touch of a lever. Even the power supply swings aside for effortless access to the motherboard and drive bays. An easy-to-upgrade tower version is also available. Like the number five Dimension XPS P200s, the GXpro uses DIMM memory modules rather than SIMMs. People who service computers love these newer modules because they make it easier to add memory without having to remove lower-capacity modules to make room. Unlike other systems with DIMM sockets, the OptiPlex GXpro 200 has four sockets instead of two. This leaves three sockets open, so graphics professionals and other people who need lots of RAM can fill 'er up.

4 MICRON MILLENNIA PRO200 PLUS

PRO: Fast, Iomega Jaz drive, good graphics card, wavetable sound card, good CD-ROM drive

CON: None significant

If you're one of the bean counters scared off by the cost of this unit reviewed for the December issue, come on back. Micron sliced the price of this minitower by a cool grand, bringing it down to a much more palatable $3708. The system comes decked out with the best components Micron offers, making it well suited for the corporate office. If you add a modem to it, it would make a nice home office system as well.

One included feature is an Iomega Jaz, a slick little portable tape backup drive. In view of how huge hard disks have gotten and how important data security is, it's surprising that more computers don't come with some sort of massive data backup system. Too few people bother with floppy jockeying, even if it's their only backup option.

Micron Pro200 Plus

Video is simply great. The Number Nine Imagine 128 Series 2 graphics card with 4MB of VRAM can deliver high-resolution true-color images on the screen, ▶

TOP 20 POWER DESKTOPS — PERFORMANCE

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Micron Millennia P166*	Pentium-166	32	512	208
2	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	230
3	Dell OptiPlex GXpro 200*	Pentium Pro-200	32	256	232
4	Micron Millennia Pro200 Plus*	Pentium Pro-200	32	256	230
5	Dell Dimension XPS P200s*	Pentium-200	16	512	208
6	Dell OptiPlex GXMT 5200	Pentium-200	32	512	216
7	Gateway 2000 G6-200	Pentium Pro-200	32	256	234
8	Compaq Deskpro 2000 Model 5200/1080	Pentium-200	32	256	218
9	HP Pavilion 7285	Pentium-200	32	256	207
10	Cyrix 6x86 P200	Cx6x86-P200+	32	256	223
11	Quantex QP5/200 M-4	Pentium Pro-200	32	256	233
12	HP Vectra 500 Model 515MCx 5/166	Pentium-166	16	256	192
13	HP Vectra VL4 5/200MT	Pentium-200	16	256	201
14	Sys Technology Performance Pro 200	Pentium Pro-200	32	256	236
15	Netis N6200PCI	Pentium Pro-200	32	256	230
16	IBM PC 350 P200	Pentium-200	32	512	215
17	ZDS Z-Station GT 500	Pentium-200	32	256	215
18	Tangent TC6200	Pentium Pro-200	32	256	230
19	Acma zPower Pro 200	Pentium Pro-200	32	256	231
20	DTK Quin-55M/P200	Pentium-200	16	512	208

*Best Buy

Word 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · WordPerfect 6.1 for Windows · Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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which in this case is a bright, crisp 17-inch monitor, the Micron 17FGx. Overall, system performance is very good, verging on outstanding. The Millennia Pro200 Plus pulled down an impressive PC WorldBench score of 230. As far as graphics goes, Micron offers a choice of the Imagine 128 Series 2 board or the Diamond Stealth 3D 2000 board.

The disk and tape drive options on the Millennia Pro200 Plus—the Jaz drive (which uses removable 1GB cartridges), a 2.1GB Seagate hard drive, and a speedy Plextor 8X CD-ROM drive—are all attached to a PCI-based BusLogic SCSI-2 controller. Multimedia is a cut above the norm, with a Sound Blaster wavetable sound card and a pair of Advent AV270 speakers. This is also one of the few systems to come with the fullest version of Microsoft Office available—Office Professional, which includes the Access database program as well as Word, Excel, and the PowerPoint presentation package.

The Pentium Pro-200 chip generates a lot of heat, and Micron wisely placed three fans inside this minitower to keep the components cool. Getting to the motherboard is a snap thanks to the system's easy-open case. You can insert up to four add-in cards (two of them PCI cards) and two externally accessible drives. The two open SIMM sockets are easy to access.

Micron covers the RAM and CPU with a five-year warranty; other parts are covered for three years. Labor is covered for one year. Tech support lines are open around the clock, though lately we've been having limited success getting through in under 45 minutes. Still, most people seem to have little trouble with Micron: The most recent results of our ongoing survey show that the company has earned the highest marks from our readers.

5 DELL DIMENSION XPS P200S

PRO: Big hard drive, 8X CD-ROM drive, fast graphics card, 28.8-kbps fax-modem

CON: A bit slower than we expected, considering use of fast SDRAM; no speakers

The Dimension XPS P200s is the top-end PC in Dell's "s" series, the follow-on to the well-regarded "c" line of Dells that topped our charts for months. The updated Intel chip set in Dell's "s" series supports SDRAM—a type of main memory that's faster than today's popular EDO DRAM. It's difficult to draw hard conclusions, considering the different configurations of the Pentium-200s we've tested, but SDRAM doesn't seem to have done the P200s much good. Its PC WorldBench score of 208 lags behind that of several Pentium-200 desktops that use EDO DRAM. Part of the problem simply may be that Dell hasn't finished fine-tuning the P200s. We'll retest soon to see if speed has improved. In the meantime, the P200s is still among the fastest Dell Dimension systems we've ever tested.

Dell Dimension P200s

One thing Dell doesn't have to tweak is the graphics card. The Number Nine Imagine 128 Series 2 with 4MB of VRAM that came with our machine adds more than $300 to the system's price, but it can handle all of your graphics chores, including high-end image editing and desktop publishing. The card even has 3-D hardware and support for CAD acceleration. Other peripherals are also the cream of the crop or nearly so: the 8X CD-ROM drive, a 512K pipeline-burst secondary cache, a crisp Dell 17-inch monitor, and a U.S. Robotics 28.8-kbps fax-modem, which rates very highly on our Top 10 Modems chart.

The system's on/off button is circular, slightly recessed, and smack in the middle of the front panel, well away from the floppy eject button. A wide foot at the minitower's base helps prevent tipping. Inside the P200s you'll find several other nice design touches: An extremely quiet fan augments the power supply fan, memory is supplied on high-capacity DIMMs, and a vertically mounted hard drive is placed just behind the internal speaker to save space. Dell bundles the Microsoft Office Professional application suite with this system but doesn't include any speakers to go with the integrated sound chip. Adding a pair of basic speakers costs you another $36.

Printed and on-screen documentation is clear and complete. Dell's system reliability and service are highly rated by our readers, and the three-year parts and one-year labor warranty, year of free on-site service, 30-day money-back guarantee, and around-the-clock tech support hours all are fine offerings.

If you don't want to spend quite as much and don't need Pentium-200 speed, we recommend the $2899 Dimension XPS P166s, which we tested with 16MB of RAM, a 17-inch monitor, and a 28.8-kbps fax-modem. Like the P200s, it's not the fastest in its processor class, but it's still a good performer.

New This Month

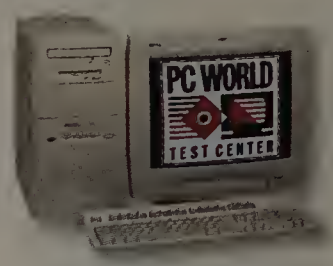
The following PCs made our Power Desktops chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

9 HP PAVILION 7285

PRO: Big hard disk, voice modem

CON: Only a one-year warranty

Hewlett-Packard's latest is an excellent machine for the home office. The Pavilion 7285 minitower offers a host of nifty features, including telephone answering capabilities and 3-D sound, and it has the quality feel of most HP products. It also performs well, as you might fairly expect of a Pentium-200 system carrying 32MB of EDO RAM. Priced at a reasonable $3560, the package also includes a 17-inch monitor, an 8X CD-ROM drive, wavetable synthesis, Altec Lansing speakers, and loads of software, making this a terrific multimedia system. In short, Hewlett-Packard has covered just about all the bases well with the Pavilion 7285—except support. More on that later.



HP Pavilion 7285

The Pavilion is both handsome and rugged, with some nice proprietary design touches. Most notable is an unusual stacked motherboard design in which a second board that contains just the expansion card connectors lies over the ▶

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motherboard. This separates the connectors from the rest of the motherboard, so there's less chance you'll damage other components when installing and removing adapter cards. There's an unusually high number of free slots (six), helped by the fact that the sound chip is integrated onto the motherboard. On the downside, you have to remove the top board to access the SIMMs and processor easily. The overall design and construction are clean, with cables neatly tucked aside, and little to no flex to the case. The Pavilion's 17-inch monitor is crisp and pleasant to look at, but the 15.5 inches of viewing area is a little under par for the course. It's driven by an S3 Virge PCI adapter with 3-D capabilities and MPEG support. With the 3.2GB hard drive, there's plenty of room even for big multimedia files. The voice modem lets the computer behave as a telephone answering machine.

Hewlett-Packard bundled a lot of software with this machine, including Quicken SE, one of the best programs around for balancing your checkbook and tracking your finances. HP also provides on-screen help and an alternate desktop called Personal Page that sits atop Windows 95. It's simpler and less powerful than Windows 95's main window, but it's prettier, and especially nice if you have kids: You can hide sensitive files and put their favorite programs within easy reach. This Pavilion's documentation is thorough and easy to read. And readers give Hewlett-Packard an excellent rating for the reliability of its desktop computers.

Support is the Pavilion's main drawback. Hewlett-Packard does offer 24-hour tech support, and if your Pavilion flakes out during the first year, service is free on-site. But the package doesn't include coverage of any kind after that. Most of all, Hewlett-Packard needs to shore up the quality of its support on its Pavilion line—readers responding to our ongoing fax-back survey rate it only as fair.

11 QUANTEX QP5/200 M-4

PRO: Smoking performance, great price, feature-rich, good expandability

CON: Poor system reliability rating and only fair service rating

Life is full of if-onlys—those niggling drawbacks that mar an otherwise marvelous thing. For instance, some people would love to cook risotto once a week—if only it didn't require constant stirring for nearly 30 minutes. In a similar vein, we have another if-only to add to the list: We would give this Pentium Pro-200 system from Quantex a glowing review—if only the company's service and reliability were better. It's been improving recently, but it still has far to go.

For an exceedingly reasonable price of $2569, Quantex delivered a Pentium Pro-200 machine that ranked among the best performers in this month's roundup—yet it costs $600 to $700 less than comparable Pentium Pro-200 models. From a price/performance standpoint, this system is difficult to beat.

And it's totally packed. The QP5/200 M-4 comes loaded with enough RAM and hard disk space to handle large multimedia files. It's also got one of the better multimedia setups you'll find on a home system, and the speakers with subwoofer produce rich, full-bodied sound. The monitor is a pleasure to use, with images looking particularly sharp and vivid. Six open drive bays allow you to add more devices, such as a tape backup drive or an extra hard drive. The company offers 15 hours of toll-free technical support each weekday, as well as weekend hours.

Quantex QP5/200 M-4

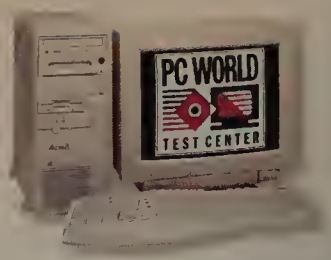
Quantex has got its PC formula down pretty well. Now it needs to get quality and service a little more under control. We've heard a number of complaints about faulty product and poor service. The company says it's working on these areas. We've already seen some improvement in the last few months. Stay tuned.

19 ACMA ZPOWER PRO 200

PRO: Fast, removable and lockable hard drive

CON: Limited drive bay expansion

Aesthetically, Acma's latest is an unimaginative bone-beige minitower. But there are more important things to look for in a computer than a handsome countenance. Sheer speed, for instance: This $3395 Pentium Pro-200 machine earned a PC WorldBench score of 231. It comes well equipped for multimedia and for exploring the riches of the World Wide Web.



Acma zPower Pro 200

The system ships with a 17-inch ADI Microscan monitor; unfortunately, the actual display area, measured diagonally, comes to 15.5 inches—a bit smaller than on other 17-inch monitors.

If you need extra data security or easy portability and upgradability, you'll appreciate the system's removable 2.1GB EIDE hard drive with keys and lock; there's also a useful on-screen glossary of computer terms preinstalled for novices. The system has two free PCI slots, one free 16-bit slot, and one shared slot, which should be enough for most users. The zPower Pro 200 is somewhat tight on drive bay space, however, with only one spot each for a 3.5-inch drive and a 5.25-inch drive. The machine's interior cables are neatly arranged, and the fan purrs quietly. The system casing is sturdy, and the large thumbscrews make it very easy to remove the case at upgrade time.

The Acma is reasonably, though not compellingly, priced. The warranty that comes with this PC—one year for labor, three years for parts—isn't bad. Phone calls are toll-free, but technical support is available only Monday through Friday. ▶

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, see PC World Online (http://www.pcworld.com/t20pcsnaps).

- **Act P-200**
- **AST Advantage 9314**
- **CLR Infinity P5-200**
- **NEC PowerMate P2200**
- **National Microcomputers P Pro 200**
- **Packard Bell Platinum 65**
- **Sony PCV-90**
- **Toshiba Infinia 7200**
- **Xi Computer Pro P-200**

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- **2.5GB Enhanced** IDE Hard Drive
- PCI Local Bus **Enhanced** IDE **Controller**
- 3.5" High Density Floppy Drive
- **Diamond 3D EDO MPEG 4MB** Graphics Accelerator
- Full Screen MPEG, CDI AVI, Cinepack, Indeo Playback
- **15" Digital** .28dp **NI,** Flat Screen SVGA Monitor
- **10X Speed Enhanced IDE** CD-ROM
- Yamaha C.S. Wave Table Stereo Sound Card
- **180W** Amplified External Stereo Speakers
- **33.6kbps FAX** Modem w/Voice Mail and Speaker phone
- **2 16550 UART Serial & 1 ECP/EPP Parallel Ports**
- **8 Bay Digital Tower** w/230W PS
- 104 Key Enhanced Keyboard, High Res. Mouse
- **Microsoft Office Pro & Online Internet CD Bundles**
- Microsoft Windows NT WorkStation 4.0

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180MHz
$2399

PATRIOT LX 3D

- **Intel Pentium**® Processors
- Intel 430VX Chip Set/Plug & Play Bios
- **32MB EDO** RAM, **512K Pipeline Burst** Cache
- **2.5GB Enhanced** IDE Hard Drive
- PCI Local Bus **Enhanced** Hard Drive
- 3.5" High Density Floppy Drive
- **Diamond Stealth 3D MPEG 4MB EDO** Graphics Accelerator
- Full Screen Real Time 3 Dimensional Graphics Capable
- Full Screen MPEG, CDI AVI, Cinepack, Indeo playback
- **17"** Digital .28dp, **NI**, flat Screen SVGA Monitor
- **12X Speed Enhanced IDE** CD-ROM
- 3D Surround Sound Stereo Sound Card
- **180W Stereo Speakers w/Sub Woofer**
- **33.6kbps Fax** Modem w/Voice Mail and Speakerphone
- **2 16550 UART Serial & ECP/EPP Parallel Ports**
- 7 Bay Digital Tower Case w/230W PS
- 104 Key Enhanced Keyboard, High Res. Mouse
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- Microsoft Windows®95 or DOS 6.2 & WFW 3.11

120MHz $1949 133MHz $1989
150MHz $2069 166MHz $2159

200MHz
$2359

POWERSTATION EXL

- Cyrix 6x86 Microprocessor
- 16MB EDO RAM, 512K Pipeline Burst Cache
- 2.5GB Enhanced IDE Hard Drive
- PCI Local Bus Enhanced IDE Controller
- 3.5" High Density Floppy Drive
- Matrox Millennia 2MB WRAM Graphics Accelerator
- Full Screen MPEG, CDI AVI, Cinepak, Indeo Playback
- 17" Digital .28dp, NI, Flat Screen SVGA Monitor
- 10X Speed Enhanced IDE CD-ROM
- Yamaha C.S. Wave Table Stereo Sound Card
- 180 Watt Amplified External Stereo Speakers
- 33.6 FAX Modem with Voice Mail & Speaker Phone
- 2 16550 UART Serial, 1 ECP/EPP Parallel Ports
- 7 Bay Digital Tower Case with 230W PS
- 104 Key Enhanced Keyboard, Hi Res. Mouse
- Microsoft Family & Online Internet CD Bundle
- Microsoft Windows '95, or DOS 6.2 & WFW 3.11
- 5 Year/3 Year USCD Warranty

150MHz $1849 166MHz $1969

200MHz
$2049

POWERSTATION 3D LX

- Cyrix 6x86 Microprocessor
- 16MB EDO RAM, 256K Pipeline Burst Cache
- 1.6GB Enhanced IDE Hard Drive
- PCI Local Bus Enhanced IDE Controller
- 3.5" High Density Floppy Drive
- **Diamond 3D EDO MPEG 2MB** Graphics Accelerator
- Full Screen MPEG, CDI AVI, Cinepak, Indeo Playback
- 15" Digital .28dp, NI, Flat Screen SVGA Monitor
- 10X Speed Enhanced IDE CD-ROM
- 3D Surround Sound Stereo Sound Card
- 180 Watt Amplified External Stereo Speakers
- 33.6 FAX Modem with Voice Mail & Speaker Phone
- 2 16550 UART Serial, 1 ECP/EPP Parallel Ports
- 7 Bay Digital Tower Case with 230W PS
- 104 Key Enhanced Keyboard, Hi Res. Mouse
- 19 Title & Online Internet CD Family Bundle
- Microsoft Windows '95, or DOS 6.2 & WFW 3.11
- 5 Year/3 Year USCD Warranty

150MHz $1349 200MHz $1569

166MHz
$1399

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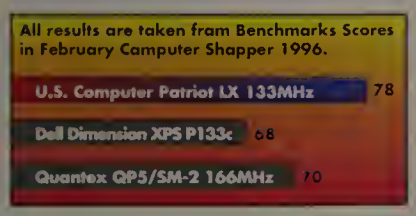

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TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (10/15/96)	CPU	Comments
1	Micron Millennia P133 800/223-6571 www.micron.com	–	NEW	$1899	Pentium-133	As fast as some P-166s; the P-150 and P-166 are also good values.
2	Dell Dimension P133v 800/388-8542 www.dell.com	1	Dec 96	$1879	Pentium-133	Fast, affordable; sound and modem are included; good first PC.
3	Dell OptiPlex GXM 5133 800/388-8542 www.dell.com	–	NEW	$2245	Pentium-133	Replacement of PC reviewed in April now has 32MB of RAM.
4	Gateway 2000 P5-133 800/846-2000 www.gw2K.com	5	Nov 96	$1709	Pentium-133	$70 price drop helps this P-133 maintain Best Buy status; fast graphics card.
5	Compaq Presario 4402 800/345-1518 www.compaq.com	–	NEW	$1999	Pentium-133	Great reliability makes up for tepid support record and limited expandability.
6	Quantex QP5/100 M-3 800/896-4898 www.quantex.com	–	Mar 96	$1499	Pentium-100	Great value, and Quantex has recently upgraded its tech support.
7	HP Vectra VE 5/133 800/752-0900 www.hp.com	7	Dec 96	$2170	Pentium-133	Corporate PC with nice touches; Unified Memory Architecture slows it down.
8	Gateway 2000 G6-180 800/846-2000 www.gw2K.com	8	Dec 96	$2324	Pentium Pro-180	Faster than a typical P-200; good workgroup server.
9	DTK Quin-55M/P133 800/289-2385 www.dtk.com	–	Dec 96	$1700	Pentium-133	$50 price cut helps move this fast PC onto chart despite poor reliability.
10	HP Vectra XM5/120 Series 4 800/752-0900 www.hp.com	10	Oct 96	$2013	Pentium-120	Well-built corporate PC backed by great reliability.
11	ProGen Discover MPEG II P150 888/776-9595 www.progen.com	13	Nov 96	$1549	Pentium-150	An option for gamers on a budget.
12	Micro Express MicroFlex PCI/5133 800/989-9900 www.wpages.com/	9	Apr 96	$1599	Pentium-133	Fast system for under $1600; latest returns indicate below-average reliability.
13	DirectWave Blue Thunder P133 MVP Pro 800/882-8108 www.directwave.com	12	Oct 96	$1699	Pentium-133	Fast for a P-133; unknown reliability and service.
14	Netis N5100 Media 800/577-7526 www.netistech.com	18	May 96	$1580	Pentium-100	Fast for a Pentium-100, but documentation is sparse.
15	Diamond Technologies P133 800/989-7253 www.diamondtech.com	–	NEW	$1650	Pentium-133	Very fast; great features such as a 33.6-kbps modem.
16	First Computer FCC P-120 800/900-1008 www.firstcomputer.com	16	Aug 96	$1399	Pentium-120	Price is hard to beat, but service and reliability are unknown.
17	Robotech Cobra XLT P-133 800/255-2215 www.robotechusa.com	19	July 96	$1799	Pentium-133	Fast home PC; spotty documentation and tech support.
18	Netis C166-PDS 800/577-7526 www.netistech.com	–	Nov 96	$2129	Cx6x86-P166+	Cyrix-based PC is faster than many P-200s.
19	Alaris Puma P166+ 800/317-2348 www.alaris.com	–	Sept 96	$1775	Cx6x86-P166+	$155 price drop puts this fast, nicely appointed system on chart.
20	Acma zPower 166V 800/786-6888 www.acma.com	17	Sept 96	$1945	Pentium-166	$50 price drop; quick multimedia system comes with PC Card slots.

Best Buy See features chart, page 206; performance chart, page 208. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available December 23).

PENTIUM-133 PCs make up more than half our Budget chart, but there are faster machines here as well. The number eight Gateway G6-180, based on the Pentium Pro-180, outruns many Pentium-200 units. Netis and Alaris offer a couple of pretty snappy PCs based on Cyrix's Cx6x86-P166+ chip. These two systems perform like most Pentium-200 PCs, but their service and reliability remain a question mark. The only budget desktop we tested this month to miss the chart was Computrend's Premio P-166. It's fast and sharp-looking, but the keyboard feels stiff, and you get support only on weekdays. You can do better for $2400. For more details, visit PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	Price	Vendor's system reliability	Features and design	PC WorldBench score/performance	Vendor's service and support	Fax reprint number[1]	Reader service number
92	average	best	outstanding	191/very good	best	3479	664
91	average	best	outstanding	188/very good	best	3462	665
87	expensive	best	very good	191/very good	best	3480	666
84	inexpensive	fair	very good	192/very good	good	3449	667
82	average	best	good	153/good	fair	3481	668
82	inexpensive	poor	outstanding	167/good	fair	3482	669
82	average	best	very good	166/good	fair[2]	3465	670
82	expensive	fair	outstanding	218/outstanding	good	3466	671
81	inexpensive	poor[2]	very good	190/very good	[3]	3483	672
81	average	best	good	177/good	fair[2]	3455	673
81	inexpensive	[3]	very good	183/very good	[3]	3451	674
81	inexpensive	[3]	very good	190/very good	[3]	3467	675
80	inexpensive	[3]	outstanding	194/very good	[3]	3469	676
80	inexpensive	[3]	very good	166/good	[3]	3471	677
80	inexpensive	[3]	outstanding	185/very good	[3]	3484	678
80	very inexpensive	[3]	good	178/very good	[3]	3470	679
80	average	[3]	outstanding	189/very good	[3]	3393	680
80	average	[3]	outstanding	209/very good	[3]	3485	681
80	average	[3]	very good	194/very good	[3]	3486	682
79	average	[3]	outstanding	199/very good	[3]	3429	683
Scorecard weightings	Price 25 percent	Reliability 25 percent	Features 20 percent	Performance 15 percent	Support 15 percent	All products:	906

[2] Limited data; score is based on responses for this company and average of all companies.
[3] Insufficient data.

This Month's Best Buys

1 MICRON MILLENNIA P133

PRO: Fast, well built, great warranty, highly rated reliability and support

CON: No modem, no software

This $1899 Millennia P133 supersedes the one we reviewed last March, and like its predecessor, it's one of the finest deals around.

Micron Millennia P133

It's hard to find any fault in the Millennia P133. The system's design is so clean and open on the inside that it leaves you wondering if everything is really there. The motherboard is easily accessible, with minimal chances for damaging other components if you're adding expansion cards or SIMMs. There's also more space than usual to add components. Four free drive bays will let you add devices such as an extra hard disk and a tape backup drive, and there are six free expansion slots at your disposal. This Pentium-133 is quite fast, too. With a PC WorldBench score of 191, it performs as well as some Pentium-166s we've seen.

The Millennia's multimedia setup is about as good as it gets. The CD-ROM drive zips along at 8X speed. The Diamond Stealth 3D 2000 video controller comes brimming with 4MB of RAM, which means you get high-resolution images in true color—a welcome sight for graphic artists. Audio is provided by the integrated Vibra 16S sound chip and 270 series Advent speakers. The 2.1GB hard disk has plenty of room for those notoriously piggy multimedia files. Even with the smaller-than-usual 15-inch monitor (the viewable portion comes to only 13.5 inches), it's no small feat for a company to offer such a package for $1899. The system lacks a modem, however. If you want to get on the Net, you should plan to spend another $150 to $200 on a 28.8-kbps or 33.6-kbps unit.

Great support has become one of Micron's fortes. Aside from a 24-hour-a-day tech support hot line, there's a three-year parts and one-year labor warranty. A free year of on-site service is also included, and the feedback we get from our ongoing fax-back survey is that readers are happy with the service provided. In our own round of tech support calls, however, we've been experiencing 45-minute and longer waits on hold; we'll continue to track this and keep you updated.

Readers have been very satisfied with the reliability of Micron's PCs, and it's clear the company put some thought into the Millennia's documentation. Micron hasn't yet joined the growing group of vendors that provide snazzy interactive on-screen help, but the hard copy manuals are easy to read and contain plenty of diagrams. Micron offers the same configuration in a Pentium-166 model that costs $200 more. We evaluated that and found it to be an excellent value, too.

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Micron Millennia P133*	Pentium-133	16	512	2.1	Diamond Stealth 3D 2000	4/EDO DRAM	15/13.5	.28	8X
2	Dell Dimension P133v*	Pentium-133	16	256	1.6	integrated Trio64V+	2/EDO DRAM	15/14	.25	8X
3	Dell OptiPlex GXM 5133*	Pentium-133	32	256	2.1	integrated S3 Trio64	2/DRAM	15/13.7	.28	8X
4	Gateway 2000 P5-133*	Pentium-133	16	256	2	STB Lightspeed 128	2/MDRAM	15/13.9	.28	8X
5	Compaq Presario 4402*	Pentium-133	16	0	1.6	integrated S3 Trio64V+	1/DRAM	15/13.6	.28	8X
6	Quantex QP5/100 M-3	Pentium-100	16	256	1.6	STB Powergraph 64 Video	2/EDO DRAM	15/14	.28	8X
7	HP Vectra VE 5/133	Pentium-133	16	256	1.1	integrated SiS 6205	2/EDO DRAM	15/14	.28	8X
8	Gateway 2000 G6-180	Pentium Pro-180	16	256	3.2	STB Lightspeed 128	2/MDRAM	15/13.9	.25	8X
9	DTK Quin-55M/P133	Pentium-133	16	512	2.1	STB Lightspeed 128	2/MDRAM	15/13.8	.28	8X
10	HP Vectra XM5/120 Series 4	Pentium-120	16	256	1.3	integrated Trio64	2/DRAM	15/13.5	.28	–
11	ProGen Discover MPEG II P150	Pentium-150	16	512	1.3	ProGen Gold 64V+ PCI	2/EDO DRAM	15/13.7	.28	8X
12	Micro Express MicroFlex PCI/5133	Pentium-133	16	256	1.6	STB Velocity 64 Video	2/VRAM	17/15.9	.28	8X
13	DirectWave Blue Thunder P133 MVP	Pentium-133	16	512	1.3	Diamond Stealth 3D 2000	2/EDO DRAM	15/13.5	.26	8X
14	Netis N5100 Media	Pentium-100	16	256	1.6	Diamond Stealth64 Video VRAM	2/VRAM	15/13.9	.28	4X
15	Diamond Technologies P133	Pentium-133	16	512	2.1	Diamond Stealth 3D 2000	2/EDO DRAM	15/13.9	.28	8X
16	First Computer FCC P-120	Pentium-120	16	512	1.2	Matrox Millennium	2/WRAM	15/13.8	.28	6X
17	Robotech Cobra XLT P-133	Pentium-133	16	256	1.3	Number Nine 9FX Motion 331	2/EDO DRAM	17/15.4	.28	6X
18	Netis C166-PDS	Cx6x86-P166+	32	256	2.1	Matrox Millennium	2/WRAM	15/13.9	.28	6X
19	Alaris Puma P166+	Cx6x86-P166+	16	256	1.6	Alaris Matinee Pro	2/EDO DRAM	15/13.6	.28	6X
20	Acma zPower 166V	Pentium-166	16	256	1.3	Diamond Stealth64 Video-2001	2/EDO DRAM	15/13.7	.28	8X

* Best Buy [1] Toll call.

2 DELL DIMENSION P133V

PRO: Fast, well designed, top reliability score

CON: Limited RAM expandability, dark monitor

The Dimension P133v's cost has risen slightly since last month, but $1879 is still a very good price for what you get. This is a powerful multimedia minitower from a company that, according to our fax-back survey, gets the top ratings for service and the reliability of its PCs. Dell's P-133 doesn't skimp on performance or features. With its 16MB of SDRAM and 256K pipeline-burst cache, it scored 188 in our PC WorldBench test suite—good for its CPU class. Our test model even came with a 16-bit sound card, something you don't usually get with a bare-bones Dell PC. (Speakers cost extra.) Dell also includes a 28.8-kbps fax-modem. Unless you confine your online activities to short e-mail messages, 28.8-kbps is the minimum speed we recommend for the Internet.

Dell Dimension P133v

With its fine stripe pitch, the Dell Trinitron monitor displays crisp images and text; however, the unit that came with our system was a little dark, and we couldn't improve the brightness. On the other hand, it does offer 14 inches of actual viewable area, generous for a monitor the manufacturer rates as 15 inches. For expanding memory, the P133v uses DIMMs, which hold more memory on a module than SIMMs. The system's two DIMM sockets can hold a total of 64MB of synchronous RAM (two 32MB DIMMs). When 64MB DIMMs become available, the system will be able to hold a total of 128MB. One DIMM socket is free in this configuration.

If you want a little extra power, there's the Dimension P200v, which we reviewed in the November issue. It's nearly identical to the P133v, but it costs $100 more and is about 10 percent faster.

3 DELL OPTIPLEX GXM 5133

PRO: Good price for a network PC, excellent reliability and support, built-in ethernet adapter

CON: No speakers

The OptiPlex GXM 5133 is a midrange model in Dell's network-ready corporate line and replaces the GXMT 5133 model we reviewed

		EXPANDABILITY						CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
–	Integrated Vibra 16S	minitower	128	512	2	3/1	6	3/1	24	Sat., Sun.	CIS, WWW
28.8	Creative Labs Vibra 16	minitower	64	512	1	3/1	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Integrated Vibra 16 PnP	desktop	128	512	2	1/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	minitower	128	256	1	2/2	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Integrated ESS 18B8	desktop	128	0	2	0/0	2	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Ensoniq Vivo-90	minitower	128	512	2	2/1	4	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
–	Sound Blaster 32 PnP	desktop	192	256	4	1/1	3	3/3	11[1]	–	AOL, BBS, CIS, WWW
–	Ensoniq Soundscape Vivo PnP	tower	128	256	2	3/6	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	minitower	128	512	2	3/3	6	2/2	9	–	WWW
–	–	desktop	128	256	4	2/0	4	3/3	11[1]	–	AOL, BBS, CIS, WWW
33.6	Audio Drive 32 PnP	minitower	128	512	2	3/2	4	3/1	9	–	BBS
–	Sound Blaster AWE32	minitower	128	512	2	3/1	7	2/2	9.5	Sat., Sun.	WWW
28.8	Sound Blaster AWE32	minitower	256	512	2	3/0	3	3/3	11	Sat.	BBS, WWW
–	Creative Labs Vibra 16	compact	128	512	2	2/1	6	1/3	10	Sat.	BBS, WWW
33.6	Wavestar 32	desktop	128	512	3	3/0	4	1/1	9	–	BBS
–	Audio Drive 32 PnP	tower	128	512	2	3/0	6	1/lifetime	11	Sat., Sun.	WWW
33.6	Sound Blaster 16	minitower	128	512	2	3/3	4	3/1	9	–	BBS, WWW
28.8	Creative Labs Vibra 16 PnP	minitower	128	512	2	3/1	5	1/3	10	Sat.	BBS, WWW
28.8	301 ESS Es16BB Audio	minitower	128	512	2	3/2	3	3/3	10	–	BBS
28.8	Sound Blaster 16	minitower	128	512	2	2/1	3	3/1	9.5	–	BBS, WWW

last April. Now it has 32MB of RAM instead of 16MB. This extra dollop of RAM may have helped the system achieve a PC WorldBench score of 191, which puts the GXM 5133 not far behind the average P-166 desktop. Many network administrators shopping for new workstations will find the built-in ethernet adapter a convenient touch. At $2245, this is a powerful PC at an affordable price.

A 2.1GB hard drive and an 8X CD-ROM drive form the disk subsystems, while video chores are handled nicely by an integrated S3 Trio 64-bit subsystem with 2MB of memory. One complaint is the lackluster display quality of the 15-inch monitor. The images were not as crisp as we're used to seeing on desktop monitors these days. The actual viewing area comes out to 13.7 inches, which is pretty much par for the course for 15-inch monitors.

The OptiPlex GXM 5133 we tested carried very few extras. No modem, software (apart from the operating system), or speakers were included with the machine. Lack of a modem is hardly a negative in a computer that's meant to be networked, but bundled software is always good to get. Sound comes from an integrated Vibra 16 sound chip.

Dell OptiPlex

Inside the box, the case was reinforced by internal cages, giving it more strength than usual. No matter how heavy a monitor you set on this midsize desktop, there's no danger of stressing vital components. Cables were tied off, and the interior was easy to move around in once the cages were removed. There was only minor flex to the unit with the exterior shell removed. We'd like to see another free bay or two (this PC has only two free drive bays), but you get five free expansion slots, which will be more than enough for most people.

Dell has continually received excellent scores from readers in our ongoing reliability and service fax-back survey. These factors, coupled with a three-year parts and labor warranty, make that part of a corporate buyer's decision a no-brainer. Excellent documentation and around-the-clock phone support for the life of the system are very positive factors as well.

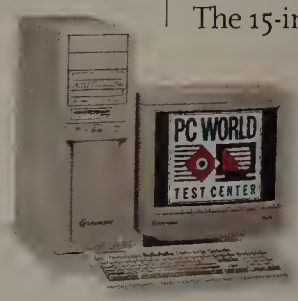
The Dell OptiPlex GXM 5133 nicely fits the bill for a no-frills corporate desktop.

4 GATEWAY 2000 P5-133

PRO: Fast, great documentation, good design

CON: No modem or sound card at this price, reliability could be better

Gateway 2000's P5-133 features a nice design, and it just got a little bit more affordable: The company shaved the price by $70 to $1709. The angular case style has a more up-to-date feel than the curvy Gateways of the past; we found it very attractive. This system is also one of the fastest P-133s we've ever tested, turning in an impressive PC WorldBench score of 192. All this helps earn the P5-133 a Best Buy. It's a great business system, but not one that we'd recommend for home use unless you add a sound card and speakers.



Gateway 2000 P5-133

The P5-133 we tested had a 2GB hard drive and an 8X Toshiba CD-ROM drive. The 15-inch CrystalScan monitor is a good basic display, but it's not Gateway's top of the line (the more expensive Vivitron). We can't find fault with the 2MB STB Lightspeed 128 graphics adapter, which has ranked near the top of our Top 10 Graphics ▶

TOP 20 BUDGET DESKTOPS

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Micron Millennia P133*	Pentium-133	16	512	191
2	Dell Dimension P133v*	Pentium-133	16	256	188
3	Dell OptiPlex GXM 5133*	Pentium-133	32	256	191
4	Gateway 2000 P5-133*	Pentium-133	16	256	192
5	Compaq Presario 4402*	Pentium-133	16	–	153
6	Quantex QP5/100 M-3	Pentium-100	16	256	167
7	HP Vectra VE 5/133	Pentium-133	16	256	166
8	Gateway 2000 G6-180	Pentium Pro-180	16	256	218
9	DTK Quin-55M/P133	Pentium-133	16	512	190
10	HP Vectra XM5/120 Series 4	Pentium-120	16	256	177
11	ProGen Discover MPEG II P150	Pentium-150	16	512	183
12	Micro Express MicroFlex PCI/5133	Pentium-133	16	256	190
13	DirectWave Blue Thunder P133 MVP Pro	Pentium-133	16	512	194
14	Netis N5100 Media	Pentium-100	16	256	166
15	Diamond Technologies P133	Pentium-133	16	512	185
16	First Computer FCC P-120	Pentium-120	16	512	178
17	Robotech Cobra XLT P-133	Pentium-133	16	256	189
18	Netis C166-PDS	Cx6x86-P166+	32	256	209
19	Alaris Puma P166+	Cx6x86-P166+	16	256	194
20	Acma zPower 166V	Pentium-166	16	256	199

*Best Buy

Word 7.0 for Windows 95
Excel 7.0 for Windows 95
Picture Publisher 6.0 for Windows 95
Paradox 5.0 for Windows
WordPerfect 6.1 for Windows
1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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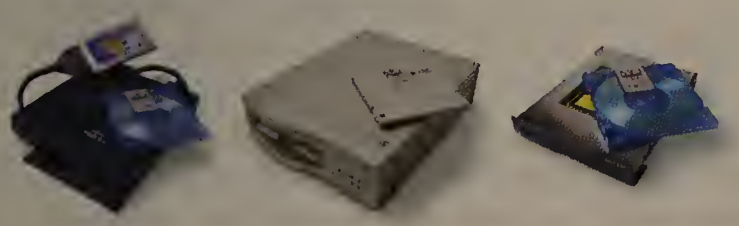

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Circle 89 on reader service card

Boards chart. The P5-133's low price also includes Microsoft Office Professional. While this sounds like a single software program, it's really a suite of full-scale applications including a word processor (Word), spreadsheet (Excel), presentation graphics program (PowerPoint), and database program (Access). Gateway earns a good service and support score because of its support policies, but our readers still rate system reliability only as fair.

The Pentium-120 version of this machine, Gateway's $1659 P5-120, is also a good budget PC.

5 COMPAQ PRESARIO 4402

PRO: Compact design, good performance, 8X CD-ROM drive, 33.6-kbps modem, Compaq's PC reliability rated very highly by readers

CON: Minimal expansion, limited video memory, no secondary cache

Despite its futuristic appearance, the Compaq Presario 4402 is a throwback. Like other all-in-one Presarios before it, this multimedia system combines monitor, motherboard, and stereo speakers—in short, everything but the keyboard and mouse—in one case. But unlike its plain, boxy Presario predecessors, this new Pentium-133 boasts an eye-catching design that would fit in at the Jetsons'. Curved speakers frame each side of the display; a built-in microphone sits atop the monitor and an infrared port below it; and the PC's front panel has more push buttons, lights, and controls—27 in all—than you'd find at a nuclear power plant. Even the keyboard has a similarly sculpted style.

So what's the problem? As with the original Macintosh, the prototype of all computers cute and completely integrated, the Presario 4402's design limits its expandability and power. Unlike other P-133 systems in its price range, the Presario 4402 has no open external or internal drive bays. It offers only one free 32-bit card slot and one free 16-bit card slot, and there is no secondary cache or space to add any. Another disadvantage is that you can't reposition the speakers to fit your needs. When playing music CDs, for instance, you might want to place the speakers farther away from you—but you can't, because the speakers are joined to the display. Fortunately the sound quality is good.

Compaq Presario

Considering the above concerns, the Presario 4402 almost missed the Best Buy ranks. But its $1999 price isn't bad for a system with 16MB of RAM and a 1.6GB hard drive, from a highly reputable company. A 33.6-kbps modem is built-in, and the included Compaq Phone Center software features voice mail, which means you can turn the PC into a telephone answering machine. The 15-inch monitor is clear, bright, and crisp. However, you should buy this PC with more than 1MB of video memory.

It's the company itself that makes this system especially inviting. Many of our readers own Compaqs, and they rate the company highly in PC reliability. Support policies are good, though our readers report that Compaq could improve the quality of the phone support they're getting. Also, while Compaq offers free on-site service for the first year and 24-hour toll-free phone support, you have to pay extra if you want to extend the support beyond one year.

New This Month

The following PC made our Budget Desktops chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

15 DIAMOND TECHNOLOGIES P133

PRO: Fast, inexpensive, big hard drive, 33.6-kbps modem, sturdy construction

CON: One-year warranty, no weekend support, some readers have complained about poor service

There's a lot you could do with $1650. You could fly to Europe, buy a new Giorgio Armani outfit, or start a wine cellar in your basement. Or, if you're feeling particularly practical, you could invest in this jewel-in-the-rough Pentium-133 from Diamond Technologies. This PC is one of the best bargains around—though it can't compare to Armani in the style department. The one-year parts and labor warranty is skimpy, making this system better for technical types who can figure things out for themselves. While Diamond certainly isn't alone here, most vendors these days are offering more generous warranties of at least one year for labor and three years for parts. What's more, Diamond offers only 9 hours a day of tech support during the work week and nada on the weekend. Though we did not obtain a big enough number of responses from our ongoing fax-back survey to give Diamond official scores on reliability and service, we have received a number of complaints from readers who have been dissatisfied with the company's technical support.

Diamond Technologies

If you're savvy about the inner workings of PCs, this P-133 is a good option. It has pretty good pep, earning a PC WorldBench score of 185, which is as good as or better than that of most other Pentium-133s we've reviewed. The 2.1GB EIDE hard drive is more capacious than usual for a budget desktop, and suits it for storing lots of multimedia files. Multimedia is well covered: You get a fast CD-ROM drive and a wavetable sound card that delivers especially rich, high-fidelity sound. Net surfers should note the fast 33.6-kbps modem. If you want to browse the Web with a minimum of waiting, a 28.8- or 33.6-kbps modem is your best bet. The system is sturdily constructed, and has sensibly arranged power-on and reset buttons and an uncluttered, organized interior for easy access to slots and components. You get three free drive bays and four free slots, which is about average for desktop PCs. ▶

Beyond the Top 20

We evaluated this system along with the others, but it didn't score high enough to reach the Top 20 Budget Desktops chart. For the write-up, see PC World Online (http://www.pcworld.com/t20pcsnaps).

◆ **Computrend Premio P-166**

"With the new 32-bit Windows version, it's making a strong bid for honors as the best all-around remote control program on the market."

PC World *March 1996*

"LapLink is the easiest program to use, and it's one of the fastest and steadiest."

Federal Computer Week *Feb. 6, 1996*

"After hours of testing, a clear usability winner emerged-LapLink was far and away our testers top choice for fuss-free remote access to files, programs, or a network, and for remote training and technical support."

PC/Computing *Sept. 1996*

"Its modular design shines in Microsoft's Windows 95's 32-bit multitasking enviorment. It is easy to use, and it also has features that make it easy for network administrators to manage."

LAN Times *Feb.19,1996*

"LapLink consistently outperformed pcAnywhere on our network. With LapLink, we felt as though the remote system was performing tasks locally, but when we switched to pcAnywhere we still felt as though we were using a modem."

PC Magazine *March 26, 1996*

"LapLink is a powerhouse for, and the granddaddy of, remote computing."

Home Office Computing *May 1996*

"...if you haven't upgraded your LapLink in a while, it's time to do it again. LapLink for Windows 95 is good."

BYTE *May 1996*

"LapLink is a superior remote access client for telecommuters, remote offices and even local clients"

PC Week *April 1996*

"When we matched it up against Symantec's pcAnywhere32 in our labs, we found that LapLink is the product we'd want with us on the road."

PC/Computing *May 1996*

"LapLink is still the tool of choice for laptop users. It may be the only remote access product you need."

LAN Magazine *June 1996*

"...LapLink's speed and intuitive design make it the best choice in the market."

Info World *Jan. 29,1996*

If you think file transfer is all we do, you need to catch up on your reading.

Designed for Microsoft Windows 95

Computer industry experts aren't in the habit of agreeing with each other. When they do, it's definitely worth noting.

It's also worth noting that LapLink® for Windows®95 has racked up more industry awards (fourteen of 'em, at last count) than every other remote access software package. Combined.

So if you aren't yet one of the millions on the move for whom LapLink is the perfect link to the desktop or the network, visit www.laplink.com or call 800-487-4396 today.

We'd be delighted to bring you up to date.

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PC WORLD

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (10/15/96)	CPU	Comments
1	Dell Latitude LM P133ST 800/613-3355 www.dell.com	1	Oct 96	$2999	Pentium-133	Steep price cuts in recent months keep this one at the top.
2	Dell Latitude XPi P133ST 800/613-3355 www.dell.com	2	Aug 96	$3699	Pentium-133	Expensive for a unit without a CD-ROM drive, but still an excellent value.
3	Gateway 2000 Solo 2100 P-133 800/846-2000 www.gw2K.com	–	NEW	$4599	Pentium-133	Awesome notebook held back by Gateway's anemic support record.
4	Compaq LTE 5250 800/345-1518 www.compaq.com	3	Dec 96	$4198	Pentium-120	Exceptionally well built and fast; note small screen size on this model.
5	IBM ThinkPad 760E 800/772-2227 www.pc.ibm.com	7	Sept 96	$5317	Pentium-133	$931 price drop helps keep this classy notebook on the chart.
6	IBM ThinkPad 560 P100 800/772-2227 www.pc.ibm.com	–	Nov 96	$2814	Pentium-100	Price hike moves this notebook from the Budget to the Power chart.
7	NEC Versa 6030H 800/632-4636 www.nec.com	8	Nov 96	$4195	Pentium-133	Quick P-133 with fine screen and built-in modem holds fast on chart.
8	Toshiba Satellite Pro 410CDT 800/457-7777 www.toshiba.com	–	Apr 96	$2799	Pentium-90	This veteran is slowest on chart these days; has a true-color screen.
9	Compaq Armada 4120T 800/345-1518 www.compaq.com	9	Nov 96	$4298	Pentium-120	Fairly fast, modular multimedia notebook uses up to three batteries at once.
10	Toshiba Tecra 720CDT 800/457-7777 www.toshiba.com	10	Sept 96	$5399	Pentium-133	Pricey and heavy, but performs well and has a true-color screen.
	BUDGET NOTEBOOKS					
1	AcerNote Light 356 800/733-2237 www.acer.com	5	Sept 96	$1699	Pentium-100	Price now $300 lower on slim, comfortable notebook; below-average screen.
2	Digital HiNote VP 800/642-4532 www.digital.com	6	Sept 96	$1999	Pentium-100	$400 price drop on fast, light, well-designed note with bright screen.
3	Toshiba Satellite Pro 420CDS 800/457-7777 www.toshiba.com	4	Sept 96	$2499	Pentium-100	Best multimedia notebook under $2500; one of fastest budget portables.
4	Sharp PC-3030 800/237-4277 www.sharp-usa.com	10	Dec 96	$1599	Pentium-100	Huge $700 price cut, long battery life.
5	AST Ascentia J30 800/876-4278 www.ast.com	–	July 96	$2399	Pentium-100	Big $600 price cut on attractive, lightweight note with long battery life.
6	Fujitsu Montego 888/466-8434 www.fujitsu-pc.com	–	Nov 96	$2694	Pentium-100	Over $600 price drop on quick, light note with long warranty.
7	Toshiba Satellite 110CT 800/457-7777 www.toshiba.com	7	Nov 96	$2499	Pentium-100	Great budget notebook with active-matrix screen; needs more RAM.
8	Broadax NP8662D 800/872-4547 www.bsicomputer.com	9	Aug 96	$2085	Pentium-120	Speedy, but support policies are undistinguished.
9	Canon Innova Book 360CD 800/848-4123 www.canon.com	–	Sept 96	$2199	Am5x86-P75	This Innova is not very innovative, but good all around.
10	DTK DTN-5A120C 800/289-2385 www.dtk.com	–	Aug 96	$2650	Pentium-120	Fairly generic multimedia notebook, but fast.

Best Buy See features chart, page 214; performance chart, page 216.

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available December 23).

WHEN WE FIRST STARTED testing Windows 95 notebooks, many battery lives were in the 1.5-to-3-hour range. Now half of the notebooks on our charts have 4-hour-plus battery lives. The most interesting notebook we evaluated this month was HP's Omnibook 5500CS. It's hobbled by a pale dual-scan screen, but its 4GB/sec infrared port allows wireless high-speed LAN connections. Toshiba's Satellite 100CS and the WinBook XP5 series of notebooks have been discontinued. For more details on the notebooks that missed the charts, visit PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	PC WorldBench score/ rating	Price	Vendor's system reliability	Features and design	Vendor's service and support	Battery life (hours:min)/ rating	Traveling weight	Fax reprint number[1]	Reader service number
87	180/outstanding	inexpensive	fair	very good	good[2]	4:32/good	heavy	3779	684
87	166/very good	average	fair	very good	good[2]	5:20/very good	average	3771	685
87	186/outstanding	average	good	outstanding	fair	3:03/good	average	3797	686
84	149/very good	average	good	good	good	5:42/very good	average	3793	687
84	177/outstanding	expensive	fair	very good	fair	2:02/satisfactory	average	3773	–
84	135/good	inexpensive	fair	good	fair	3:35/good	very light	3789	–
84	174/outstanding	average	fair	very good	fair	3:04/good	heavy	3785	688
82	125/good	inexpensive	good	good	fair[2]	5:03/very good	heavy	3798	689
82	143/good	average	good	very good	good	4:27/good	heavy	3786	690
82	160/very good	expensive	good	outstanding	fair	4:23/good	very heavy	3772	691
Scorecard weightings	**Performance 22 percent**	**Price 14 percent**	**Reliability 22 percent**	**Features 16 percent**	**Support 10 percent**	**Battery life 8 percent**	**Weight 8 percent**		
79	118/good	inexpensive	[3]	good	[3]	2:57/good	light	3777	692
79	139/very good	average	[3]	good	[3]	3:36/good	light	3776	693
79	142/outstanding	expensive	good	good	fair	4:02/good	heavy	3771	694
78	89/good	very inexpensive	[3]	satisfactory	[3]	4:56/very good	light	3797	695
78	117/good	average	fair[2]	good	fair[2]	5:12/very good	light	3799	696
76	136/very good	expensive	[3]	good	[3]	4:56/very good	light	3787	697
76	98/good	expensive	good	good	fair	3:35/good	average	3792	698
73	141/outstanding	average	[3]	good	[3]	2:10/satisfactory	heavy	3796	699
73	83/satisfactory	average	[3]	good	[3]	3:21/good	average	3800	700
72	144/outstanding	expensive	[3]	very good	[3]	2:16/satisfactory	heavy	3801	701
Scorecard weightings	**Performance 14 percent**	**Price 22 percent**	**Reliability 22 percent**	**Features 16 percent**	**Support 10 percent**	**Battery life 8 percent**	**Weight 8 percent**	**All products:**	**907**

[1] Limited data; score is based on responses for this company and average of all companies.
[3] Insufficient data.

POWER NOTEBOOKS

This Month's Best Buys

1 DELL LATITUDE LM P133ST

PRO: Large, crisp screen; terrifically fast

CON: None significant

Dell just cut the price of the Latitude LM P133ST by $200, bringing it to $2999. This Pentium-133 multimedia notebook performs like a P-133 *desktop*. In our test, the Dell managed to wring 4.5 hours per charge out of its lithium ion battery. The system comes with good integrated stereo speakers. The Latitude LM is very sturdy and has a comfortable keyboard and smooth touchpad. Dell's service is good, according to our ongoing reader fax-back survey. Support policies are strong and include a three-year warranty on parts and one year on labor, and 24-hour toll-free technical support. Documentation, both on-screen and printed, is very good.

Dell Latitude LM

TOP 20 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOKS	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (MB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Dell Latitude LM P133ST*	Pentium-133	8.8	16	810	active	12.1	800 x 600	256	lithium ion	touchpad
2	Dell Latitude XPi P133ST*	Pentium-133	7.2	24	1215	active	11.3	800 x 600	256	lithium ion	trackball
3	Gateway 2000 Solo 2100 P-133	Pentium-133	8.2	40	1440	active	12.1	800 x 600	65,536	lithium ion	touchpad
4	Compaq LTE 5250	Pentium-120	8.4	16	810	active	10.4	800 x 600	65,536	NiMH	eraserhead
5	IBM ThinkPad 760E	Pentium-133	7.8	24	1080	active	12.1	800 x 600	65,536	lithium ion	eraserhead
6	IBM ThinkPad 560 P100	Pentium-100	5.8	16	810	dual-scan	11.3	800 x 600	256	lithium ion	eraserhead
7	NEC Versa 6030H	Pentium-133	8.6	16	1358	active	12.1	800 x 600	65,536	lithium ion	touchpad
8	Toshiba Satellite Pro 410CDT	Pentium-90	9	16	814	active	11.3	800 x 600	16.8 million	lithium ion	eraserhead
9	Compaq Armada 4120T	Pentium-120	10	16	1080	active	11.8	800 x 600	65,536	lithium ion	touchpad
10	Toshiba Tecra 720CDT	Pentium-133	10.6	16	1130	active	12.1	1024 x 768	16.8 million	lithium ion	eraserhead
	BUDGET NOTEBOOKS										
1	AcerNote Light 356*	Pentium-100	6.8	16	810	dual-scan	10.4	640 x 480	65,536	NiMH	touchpad
2	Digital HiNote VP*	Pentium-100	6.8	16	810	dual-scan	10.4	800 x 600	256	NiMH	touchpad
3	Toshiba Satellite Pro 420CDS	Pentium-100	8.8	16	772	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
4	Sharp PC-3030	Pentium-100	6.8	8	543	dual-scan	11.3	800 x 600	65,536	lithium ion	touchpad
5	AST Ascentia J30	Pentium-100	6.6	8	810	active	11.3	800 x 600	65,536	lithium ion	eraserhead
6	Fujitsu Montego	Pentium-100	6.4	16	1083	active	10.4	800 x 600	256	lithium ion	eraserhead
7	Toshiba Satellite 110CT	Pentium-100	7.4	8	814	active	11.3	800 x 600	65,536	NiMH	eraserhead
8	Broadax NP8662D	Pentium-120	9.6	16	811	dual-scan	11.3	800 x 600	256	NiMH	touchpad
9	Canon Innova Book 360CD	Am5x86-P75	8.2	8	814	dual-scan	10.4	640 x 480	256	NiMH	touchpad
10	DTK DTN-5A120C	Pentium-120	9.4	16	810	active	10.4	800 x 600	256	NiMH	touchpad

*Best Buy ● Yes ○ No [1]Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one. [2]Toll call.

2 DELL LATITUDE XPI P133ST

PRO: Fast, long battery life, good screen

CON: No internal CD-ROM drive option

If you don't need a CD-ROM drive in your power notebook, then the $3699 Dell Latitude XPi P133ST (down $700 from last month) is your best choice. It's not as fast as its top-ranking sibling, but its PC WorldBench score of 166 is still solid. Plus, the XPi's long 5.3-hour battery life is exceptional, and at 7.2 pounds, the system is a pound and a half lighter than the LM P133ST.

Dell Latitude XPi

The XPi's NeoMagic video chip has a fast 128-bit core and 1MB of video RAM to accelerate display. The crisp 11.3-inch active-matrix screen has 800 by 600 resolution. The Latitude XPi is sturdy, but its keyboard is cramped and the trackball a bit unruly. Bundled software includes Traveling Software's LapLink, a file transfer program, and Starfish's Sidekick 95, a personal information manager.

New This Month

The following PC made our Power Notebooks chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

3 GATEWAY 2000 SOLO 2100 P-133

PRO: Outstanding performance, top-notch display, lots of memory, large hard drive

CON: Slim warranty, subpar service and support

Gateway's been so good at putting out attractive systems, it's a shame it can't seem to pull its service and support act together. But this sturdy $4599 notebook is the fastest we've tested; it performs like a Pentium-166 desktop. The 40MB of RAM no doubt helped. The unit's 1.4GB hard drive is particularly gener-

Gateway Solo 2100

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
6X	–	40	1	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	40	0	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
6X	–	40	1	●	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	–	72	1	●	●	●	3/3	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
–	28.8	80	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	24	0	○	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	28.8	48	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
4X	–	40	0	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
4X	–	48	1	●	●	●	3/3	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
6X	28.8	144	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
–	–	40	0	○	○	○	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	40	1	●	●	○	1/1	14	–	AOL, BBS, CIS, WWW
6X	–	40	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
–	–	40	0	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
–	14.4	40	0	○	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	40	0	●	○	●	3/3	24	Sat., Sun.	–
–	–	40	0	○	●	○	1/1	24	Sat., Sun.	BBS, CIS, MSN, WWW
4X	–	40	0	○	●	●	1/1	9 [2]	–	BBS
4X	–	32	0	○	○	●	1/1	18	Sat., Sun.	BBS, CIS, WWW
4X	28.8	40	0	○	○	●	2/2	9	–	WWW

ous for a notebook. The 6X CD-ROM drive is removable; into the same bay you can put a floppy drive or an additional battery. A single battery pack lasted for 3 hours on a charge in our run-down test.

The screen was great: 12.1 inches of sharp, bright, and clear text and graphics, displayed in super-VGA resolution. The two speakers are located on the keyboard wrist rest—we'd rather see them on the display panel, where they can project sound better. However, the included set of Koss headphones works very nicely.

Gateway also included Microsoft Office Professional, a suite of four major applications. The documentation is easy to follow and designed for a quick read.

BUDGET NOTEBOOKS

This Month's Best Buys

1 ACERNOTE LIGHT 356

PRO: Great price, light weight, comfortable keyboard, three-year warranty

CON: Slow for a P-100 note with this configuration, dull screen

Acer made some mighty deep price cuts on its AcerNote Light. Now, a terrific $1699 price makes this one of the least expensive notebooks on the Budget chart.

Acer bundled a couple of useful programs (Sidekick and Quicken). This unit isn't as slim as some notebooks we've seen, but it's still just 2 inches thick. And the keyboard and touchpad are comfortable to use.

AcerNote Light 356

This notebook could use a better display; the colors on the 10.4-inch dual-scan panel looked a little washed out. Acer backs its notebooks with a strong warranty: During the first year, the company will replace a defective notebook; over the next two years, you can send it in to be fixed at no extra cost. Technical support is available around the clock but is free only for the first year. After that, you can pay for a variety of support plans.

2 DIGITAL HINOTE VP

PRO: Exceptional P-100 performance, good battery life, bright display for a dual-scan screen

CON: No built-in CD-ROM option, sparse software bundle

Digital HiNote VP

A large price drop to $1999 makes this light and lively notebook a Best Buy. With a PC WorldBench score of 139, the HiNote VP is very fast, and its keyboard is roomy, comfortable, and responsive. You control the pointer with a touchpad that's easy to use. The system's 10.4-inch screen, which has 256 colors, looks sharp for a dual-scan and has excellent controls for brightness and contrast. Digital backs the HiNote VP with a one-year warranty. Toll-free technical support is limited to weekdays. ■

Beyond the Top 20

We also evaluated the following systems, but they didn't reach the Top 20. For write-ups, see PC World Online (http://www.pcworld.com/t20pcsnaps).

- **Fujitsu Monte Carlo**
- **HP Omnibook 5500CS**
- **Nimantics Orion 6X P-166**
- **Sceptre Pentium 133 Sound Note**
- **Sharp PC 9070**
- **Texas Instruments TravelMate 6050**

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Latitude LM P133ST*	Pentium-133	16	256	180
2	Dell Latitude XPi P133ST*	Pentium-133	24	256	166
3	Gateway 2000 Solo 2100 P-133	Pentium-133	40	256	186
4	Compaq LTE 5250	Pentium-120	16	256	149
5	IBM ThinkPad 760E	Pentium-133	24	256	177
6	IBM ThinkPad 560 P100	Pentium-100	16	–	135
7	NEC Versa 6030H	Pentium-133	16	256	174
8	Toshiba Satellite Pro 410CDT	Pentium-90	16	–	125
9	Compaq Armada 4120T	Pentium-120	16	256	143
10	Toshiba Tecra 720CDT	Pentium-133	16	256	160
	BUDGET NOTEBOOKS				
1	AcerNote Light 356*	Pentium-100	16	–	118
2	Digital HiNote VP*	Pentium-100	16	–	139
3	Toshiba Satellite Pro 420CDS	Pentium-100	16	–	142
4	Sharp PC-3030	Pentium-100	8	–	89
5	AST Ascentia J30	Pentium-100	8	–	117
6	Fujitsu Montego	Pentium-100	16	–	136
7	Toshiba Satellite 110CT	Pentium-100	8	–	98
8	Broadax NP8662D	Pentium-120	16	256	141
9	Canon Innova Book 360CD	Am5x86-P75	8	–	83
10	DTK DTN-5A120C	Pentium-120	16	256	144

*Best Buy

Word 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · WordPerfect 6.1 for Windows · Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC World8ench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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CPU by AMD Am5x86-P75

*10/31/96 evaluation by Ron Jarmuth, Chief Automation Technology Branch, HQDA–IMCEN, Pentagon Automation Technology Branch. Kingston Technology Company, 17600 Newhope Street, Fountain Valley, CA 92708 USA, (714) 435-2600, Fax (714) 435-2699. © 1996 Kingston Technology Company. All rights reserved. Kingston is a registered trademark and Computing Without Limits and TurboChip are trademarks of Kingston Technology Company. Windows NT is a registered trademark of Microsoft Corporation.

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Win a DTK Quin-55M/P133

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a DTK Quin-55M/P133, a Pentium-133 PC in this month's Top 20. Send in a separate copy of the survey for each of your PCs.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to *PC World*, Box 1-SS, c/o 800-SCAN, 543 Howard St., San Francisco, CA 94105-3013. Surveys must be received by January 31.

PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.

HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

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FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Apple ○ AST ○ AT&T (NCR) ○ Austin (IPC) ○ Axik ○ Blackship ○ Canon ○ Compaq ○ Compudyne
○ Computrend ○ Comtrade ○ CTX ○ Dell ○ Diamond ○ Digital (DEC) ○ DTK ○ EPS ○ Epson ○ Everex ○ Future Tech ○ Gateway 2000
○ Hewlett-Packard ○ HiO ○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro ○ MIS ○ Nat'l Micro
○ NEC ○ Netis ○ Packard Bell ○ Panasonic ○ PerComp ○ Pionex ○ Polywell ○ Quantex ○ Robotech ○ Samsung ○ Sharp ○ Swan
○ Tangent ○ Texas Instruments ○ Toshiba ○ Twinhead ○ USA Flex ○ Vektron ○ VTech (Expotech, Laser) ○ WinBook ○ Zenith (ZDS) ○ Zenon ○ Zeos ○ Other

What size is this PC?
○ Desktop
○ Notebook/laptop
○ Handheld

What is the CPU?
○ PowerPC
○ Pentium
○ B04B6
○ B03B6
○ Other

Where did you buy this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ Value-added reseller
○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week
○ 1-2 weeks
○ 3-4 weeks
○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR
○ Staff computer technician
○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 92 ○ 93 ○ 94 ○ 95 ○ 96 ○ 97

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Answer for the most recent problem—*other than DOA*—not reported in a prior survey.

When did this problem occur? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 92 ○ 93 ○ 94 ○ 95 ○ 96 ○ 97

How long after you purchased your PC did the problem occur?
○ Less than 1 month ○ 1-3 months ○ 4-6 months ○ 7-12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store
○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1-2 minutes ○ 3-5 minutes ○ 6-10 minutes ○ 11-20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes-1 hour ○ 2-5 hours ○ 6-10 hours ○ 11-24 hours ○ 1½-2 days ○ 3-5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1-2 days ○ 3-7 days ○ 8-14 days ○ 15-30 days ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was it resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

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RDC-2
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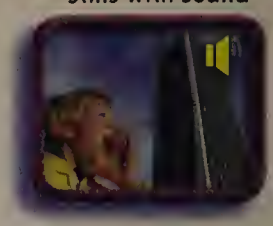
Stills with Sound



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- **LCD Monitor** (optional) allows you to view your images before and after you shoot them.
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- **Output to Virtually All Digital Media**: Output to color PC or video printer, TV monitor, or send still images and sound around the world via modem/digital phone.
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TOP 10 PRINTERS

	MONOCHROME WORKGROUP PRINTERS	Month tested	Street price (9/3/96)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	Lexmark Optra Lx+ 800/891-0331 http://www.lexmark.com	July 96	$1950	89	10.7	1.4	**FEATURES:** 16-ppm laser. Standard 4MB of RAM, 600-by-600-dpi resolution (true 1200 dpi with at least 8MB of RAM), 500 sheets input and output. **PRO/CON:** Excellent print quality. Easy-to-read LCD labels on control panel. Somewhat slow, especially printing full-page graphics.	621
2	Lexmark Optra R+ 800/891-0331 http://www.lexmark.com	Nov 96	$1300	88	10.8	1.2	**FEATURES:** 16-ppm laser. Standard 4MB of RAM, 600-by-600-dpi resolution (true 1200 dpi with at least 8MB of RAM), 200 sheets input, 250 output. **PRO/CON:** Print quality, speed, and design resemble the Optra Lx+'s, but paper capacity is lower. Upgraded model costs $150 less than previous version.	622
3	IBM Network Printer 12 800/426-3333 http://www.ibm.com	NEW	$1250	88	8.7	2	**FEATURES:** 12-ppm laser. Standard 4MB OF RAM (tested with 2MB at press time), 600-by-600 dpi resolution, 250 sheets input, 270 output. **PRO/CON:** Lowest price on the chart; fast graphics printing; very good print quality. Support policies include a year's free on-site service. Manuals can be confusing.	–
4	HP LaserJet 5M 800/752-0900 http://www.hp.com	July 96	$1799	87	9.5	1.1	**FEATURES:** 12-ppm laser. Standard 6MB of RAM, 600-by-600-dpi resolution, 250 sheets input and output. **PRO/CON:** Very good print quality. Ethernet standard. Easy to use control panel. Maximum paper capacity is only 750 sheets; most printers on the monochrome chart exceed 1000 maximum.	623
5	Okidata OL1200/PS 800/654-3282 http://www.okidata.com	July 96	$1399	87	8.9	2.3	**FEATURES:** 12-ppm LED. Standard 6MB of RAM, 600-by-600-dpi resolution, 500 sheets input, 250 output. **PRO/CON:** Inexpensive. Good print quality and performance, but control panel not as intuitive as the Lexmarks' or HP's. On-site service is free for first year.	624
	COLOR WORKGROUP PRINTERS							
1	HP DeskJet 1600CM 800/752-0900 http://www.hp.com	July 96	$1999	89	4.4	0.5	**FEATURES:** 8-ppm monochrome/2-ppm color ink jet with 6MB of RAM, 600-by-600-dpi monochrome, 300-by-300-dpi color. **PRO/CON:** Inexpensive for good print quality and adequate speed; PostScript and ethernet are included. Ink jet pages, unlike a laser's, are sensitive to moisture and light.	625
2	Tektronix Phaser 350 800/835-6100 http://www.tek.com	NEW	$3495	88	3.4	0.9	**FEATURES:** 6-ppm solid ink printer. Standard 8MB of RAM, 300-by-300-dpi monochrome and color. **PRO/CON:** Stellar color print quality, fastest graphics speed on the color chart, solid ink blocks are easy to load, black ink is free for as long as you own printer. Slow printing text.	626
3	Xerox XPrint 4920 Plus 800/349-3769 http://www.xerox.com	Sept 96	$6500	86	5.5	0.3	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 16MB of RAM, 600-by-600-dpi monochrome and color. **PRO/CON:** Superb print quality; optional feeder/printer cabinet ($1341) gives it the highest maximum paper capacity (1750) of any color laser on the chart. Slow printing full-page graphics.	627
4	Tektronix Phaser 550 800/835-6100 http://www.tek.com	July 96	$5945	85	5.6	0.5	**FEATURES:** 14-ppm monochrome/5-ppm color laser with 8MB of RAM, 600-by-600-dpi monochrome and color (true 1200 dpi with RAM upgrade). **PRO/CON:** Least expensive color laser on the chart; versatile paper handling accommodates labels. Proprietary RAM is expensive.	628
5	HP Color LaserJet 5M 800/752-0900 http://www.hp.com	July 96	$7395	85	6.9	0.9	**FEATURES:** 10-ppm laser. Standard 24MB of RAM, 300-by-300-dpi monochrome and color. **PRO/CON:** Fastest color laser we've tested. Ethernet standard. Print quality is good for text and simple graphics, but not sophisticated continuous-tone images like photographs.	629

Best Buy http://www.pcworld.com/t10printers Windows 95-certified Plug and Play All products: 903

HOW WE TEST The overall rating for both monochrome and color workgroup printers is based on print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (15 percent), service and support (13 percent), and cost of consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

IBM WASTED NO TIME after the company's five-year noncompete agreement with Lexmark expired. IBM's new Network Printer 12, debuting at third place on the monochrome chart, is hot on the heels of Lexmark's Optra Lx+ and Optra R+. On the color chart, the Tektronix Phaser 350 debuts in second place.

How did IBM do it? Low price and fast graphics speed. The Network Printer 12's $1250 street price is the lowest on the

monochrome chart, and its 2-pages-per-minute graphics speed is one of the fastest. Its 8.7-ppm text speed is average for the monochrome lasers we've tested.

The IBM's print quality is also impressive. Its remarkably deep black toner draws sharp text and smooth gray-scale images. IBM's generous support policies include a year of free on-site service and free, round-the-clock technical support.

That said, the Network Printer 12 has some minor flaws. Its documentation is overly long—four volumes—and some of its illustrations are hard to follow. Its maximum input capacity of 750 sheets is low: Both of the Lexmarks exceed 1000 sheets. Finally, the pages we printed from the IBM tended to curl. This may have been caused by our lab's dry environment.

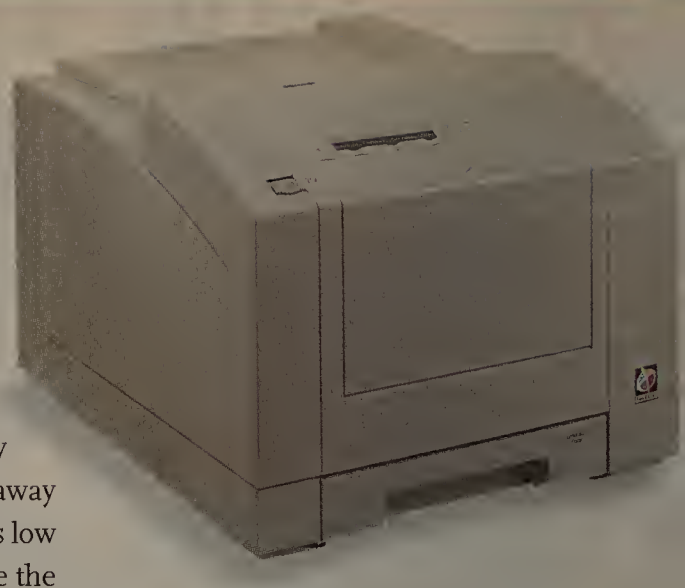
The Network Printer 12 we received was configured with 2MB of standard RAM, but just before IBM launched the printer, the standard was upgraded to 4MB. We'll retest the Network Printer 12 with 4MB of RAM in the March issue.

PHASER 350 WAXES BRILLIANT

WHAT'S BLACK AND white and free all over? Monochrome pages printed with the Tektronix Phaser 350, the first solid-ink printer we've tested for the Top 10. It debuts at number two on the color chart this month, coming close to unseating the Best Buy, HP's DeskJet 1600CM. The Phaser 350 rose this far because it occupies a fairly happy medium between an ink jet that's inexpensive but needs coated paper to print its best, and a color laser that's not as picky, but costs much more. The $3495 Tektronix is cheaper than most color lasers, and it prints its eye-popping colors on all kinds of paper. To help convince customers that it's okay to use a color printer for ordinary text documents, Tektronix will give away the black ink indefinitely—making its low cost per page even lower. But because the Phaser 350's text printing is slow and its paper handling limited, it's best for offices that print color output as much as or more than plain black.

The Phaser 350's solid ink technology melts chunky, crayonlike blocks of ink and sprays them onto paper, producing a somewhat shiny, waxlike finish and rich colors that make laser and ink jet pages pale in comparison. The Phaser 350's graphics speed is the fastest we've seen from a color printer, too, at nearly 1 ppm.

So what's not to like about the Phaser 350? Its 3.4-ppm text speed in our tests is the slowest on the chart. Text printing is less crisp than a laser's, especially with small type. The printer cannot take legal-size paper or envelopes, and you need a special tray for transparencies. The slightly raised ink printed by the Phaser 350 caused jams in our office copier's autofeeder. Finally, the printer's hot-wax smell could be annoying in an enclosed space.



THE NEW TEKTRONIX PHASER 350'S solid ink produces exceptional color prints and decent black text. Better yet, the Phaser 350's black ink is free indefinitely.

Three other color printers we tested this month did not make the chart: The $5999 Apple Color LaserWriter 12/660 PS and $3399 QMS magicolor WX lasers, and Epson's $389 Stylus Color Pro ink jet. The Stylus Color Pro is networkable and far cheaper than anything else on the chart, but it lacks the speed and paper capacity to compete. Street-priced at $5999, the new Apple Color LaserWriter 12/660 PS costs less than the Canon, IBM, and Lexmark printers we've tested that use the same engine, but it's not as fast.

A $3399 COLOR LASER FROM QMS

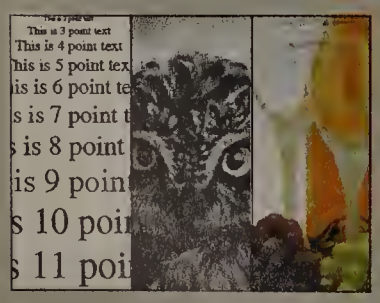
WITH ITS ROCK-BOTTOM $3399 street price—the lowest of any color laser we've tested—QMS's magicolor WX should have been a contender. Its monochrome output is good; color images look a little washed-out. The interior is easily accessible for replacing toner and parts. Its documentation is clearly illustrated. Unfortunately, the QMS is slow. It turned in respectable times for graphics pages, but was noticeably slower than other color lasers on plain text. This is in part because the magicolor WX is a Windows-only printer—which means no PostScript or Macintosh support, and it depends on your CPU for processing power.

—*Dan Littman*

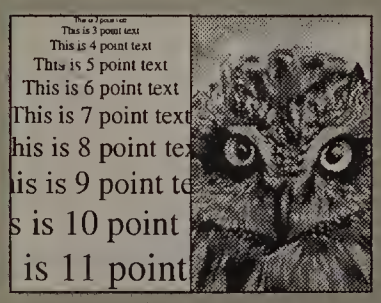
Dan Littman has covered printers for ten years. Testing performed by Dave Casini of the PC World Test Center. ■

PRINT QUALITY SAMPLES

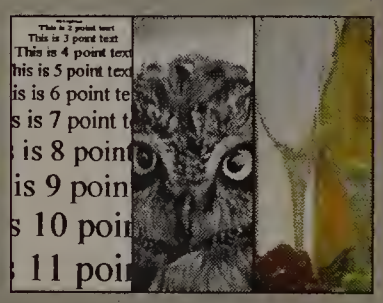
Tektronix Color and IBM Text Stand Out



TEKTRONIX PHASER 350
This solid-ink printer's deeply saturated colors pop from the page. Text quality is good, but finer lines and smaller fonts can look a little fuzzy.



IBM NETWORK PRINTER 12
This new monochrome laser from IBM prints very good text and gray-scale images—due in part to its unusually black toner.



QMS MAGICOLOR WX
This low-priced $3399 laser offers very good text print quality, but color graphics look a little washed out. Its slow print speeds kept it off the chart.

Not all 800 pound gorillas are what they're cracked up to be.

If you need a scanner that combines high performance and maximum value, may we suggest a little head-to-head competition. UMAX vs HP? Unfair comparison? Maybe for them. UMAX has a reputation for offering advanced, award-winning scanners at prices that make good business sense. Plus, our software bundles are unmatched, even by the big boys. So why monkey around? Compare the UMAX Vista S-12 with the HP ScanJet 4c and decide for yourself.

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Bit depth	✔ 33-bit[1]	30-bit
Scanning speed (5" x 7" color photo)	✔ 18 sec.	42 sec.
Lamp	✔ Cold cathode - lasts longer	Fluorescent
Tech support	✔ Toll free	No 800 number
Price	✔ $699[2]	$ 938[3]

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HP ScanJet 4c

[1] 33-bit equivalent with the analog gamma correction. [2] Estimated street price after $50 mail-in rebate. [3] Average street price from sampled advertisements in Computer Shopper Sept. 1996.

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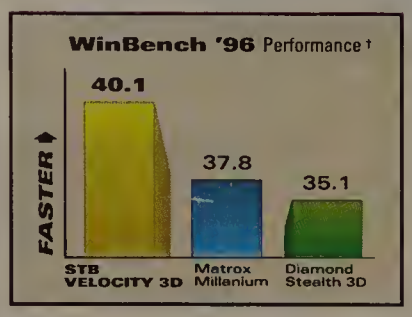

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PC WORLD

TOP 10 MONITORS

	17-INCH MONITORS	Month tested	Street price (9/1/96)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	Iiyama Vision Master Pro 17 800/394-4335 http://www.iiyama.com	retested this month	$829	90	very good/ excellent	**FEATURES:** 15.9-inch viewable screen, .25mm Diamondtron tube, up to 85-Hz refresh rate [1], Level 2b Plug and Play ready [2], three-year warranty, 12-hour weekday toll-free support. **PRO/CON:** Best graphics detail, superb text clarity, easy-to-adjust on-screen menus, large screen size; two faint lines visible across screen.	611
2	Panasonic PanaSync S17 201/348-7000 http://www.panasonic.com	Sept 96	$699	84	very good/ very good	**FEATURES:** 15.7-inch viewable screen, .27mm dot pitch tube, up to 85-Hz refresh rate rate [1], Level 2b PnP ready [2], three-year warranty, 24- hour daily toll-free support. **PRO/CON:** Low price, accurate text and graphics; on-screen menu icons are difficult to decipher, must press control buttons too much to find on-screen menu items.	612
3	Continental DigiView 1709D 818/854-8288 http://www.digiview.com	Sept 96	$799	83	very good/ very good	**FEATURES:** 15.9-inch viewable screen, .25mm Diamondtron tube, up to 101-Hz refresh [1], Level 2b PnP ready [2], three-year warranty, 8-hour toll-free workday support. **PRO/CON:** Good price, text and pictures are very crisp, main control button looks odd but adjusting screen is easy; rear on/off switch is hard to reach.	613
4	Princeton Graphic Systems Ultra 17+ 800/747-6249 http://www.prgr.com	Sept 96	$635	83	good/ very good	**FEATURES:** 15.8-inch viewable screen, .28mm dot pitch tube, up to 85-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty, 24-hour daily toll-free technical support (automated after 5 p.m.). **PRO/CON:** Lowest price on the chart, graphics look very detailed, sharp text; some on-screen menu icons are difficult to decipher.	614
5	Packard Bell 3020 800/733-5858 http://www.packardbell.com	Sept 96	$660	82	very good/ very good	**FEATURES:** 15.7-inch viewable screen, .28mm dot pitch tube, up to 75-Hz refresh rate [1], Level 2b PnP ready [2], 24-hour daily toll-free support. **PRO/CON:** Low price, very good type and image detail, awkward four-button control panel, lacks reset and image tilt controls, only a one-year warranty if not purchased with a PC.	615
6	IBM P70 800/426-7255 http://www.pc.ibm.com	Sept 96	$1069	82	very good/ very good	**FEATURES:** 15.9-inch viewable screen, .25mm Trinitron tube, up to 85-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty, 24-hour daily toll-free support. **PRO/CON:** Sharp text and graphics, easy-to-use on-screen menus, large actual screen size; highest price on chart, two faint lines visible across screen.	–
7	ViewSonic PT770 909/869-7976 http://www.viewsonic.com	Sept 96	$849	81	very good/ good	**FEATURES:** 15.9-inch viewable screen, .25mm Diamondtron tube, up to 101-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty, 11-hour workday support. **PRO/CON:** $50 price drop, text is very sharp, vivid graphics, large actual screen size, easy to adjust, color correction software; two faint lines visible across screen.	616
8	Dell UltraScan D1726T-HS 800/289-3355 http://www.dell.com	Sept 96	$739	81	good/ good	**FEATURES:** 15.7-inch viewable screen, .25mm Trinitron tube, up to 105-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty, 24-hour daily toll-free support. **PRO/CON:** $60 price cut, crisp text and graphics, easy controls (press a button, and the appropriate adjust gauge appears); two faint lines visible across screen.	617
9	Samsung SyncMaster 17GLsi 818/365-8131 http://www.sosimple.com	Sept 96	$910	80	very good/ satisfactory	**FEATURES:** 15.8-inch viewable screen, .26mm dot pitch tube, up to 105-Hz refresh [1], Level 2b PnP ready [2], three year warranty, 24-hour daily toll-free support. **PRO/CON:** Very crisp text, easy-to-use button controls, extensive on-screen menus, high refresh rate; ho-hum graphics, expensive.	618
10	Wyse Technologies WY-17PS 800/438-9973 http://www.wyse.com	Sept 96	$799	80	good/ very good	**FEATURES:** 15.9-inch viewable screen, .25mm Diamondtron tube, up to 101-Hz refresh rate [1], Level 2b PnP ready [2], three-year warranty, toll-free support 9 hours on weekdays. **PRO/CON:** Detailed text and images, same controls as Continental; expensive, rear on/off switch, two faint lines visible across screen.	619

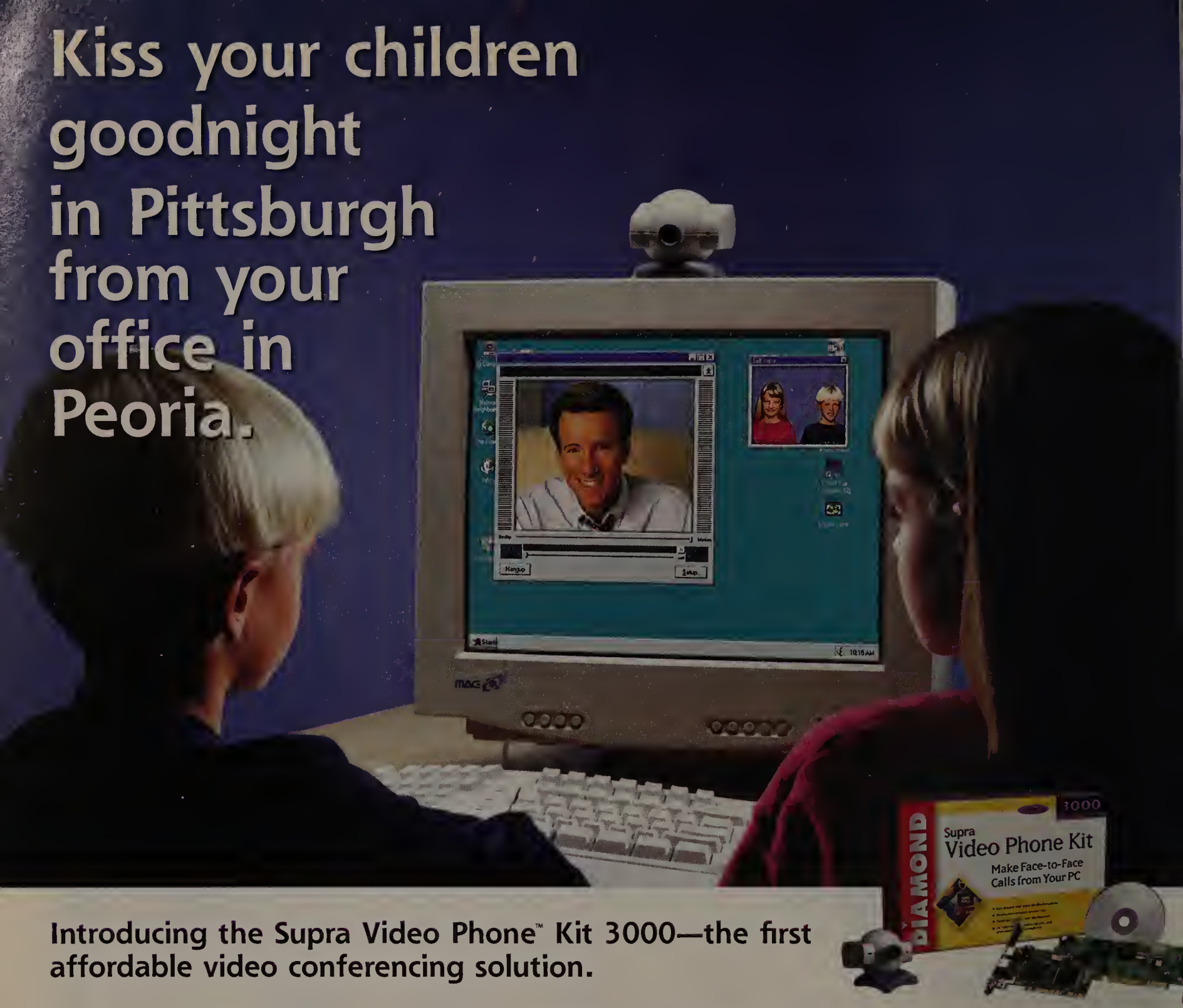
Best Buy http://www.pcworld.com/t10monitors All products: 902

[1] Highest refresh rate at 1024 by 768 resolution. [2] Level 2b Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, spreadsheets, Web pages, and scanned images. The overall rating is based on price (30 percent), features and ease of use (25 percent), text and graphics quality (20 percent each), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

TWO 17-INCH MONITORS that vendors mistakenly said were dropped are back on the Top 10. The $829 Iiyama Vision Master Pro 17 regains our top Best Buy with near-perfect image and text detail. In fourth is the $635 Princeton Graphic Ultra 17+. Graphics are crisp and the price is great. IBM's $170 price misquote sinks its P70 to sixth. We also tested Compaq's P70 and Princeton's EO 17 and EO 70 units, but display quality was so-so.

Kiss your children goodnight in Pittsburgh from your office in Peoria.



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The Supra Video Phone Kit 3000 from Diamond puts you face-to-face with friends, family and business associates—whether you're using a regular phone line or the Internet. This exciting new video phone solution has everything you need including: **the SupraExpress™ 336 modem** which incorporates Rockwell's new modem technology, the **Diamond Crunch It™ 1001 video capture card** and a full-featured **color video camera** with built-in microphone. Plus, the Supra Video Phone Kit 3000 supports H.324 for seamless compatibility with other standard video phones. And it's fast—up to 15 frames per second. All you need is a 100Mhz Pentium® processor, a sound card and a phone line. Best of all, our video phone solution is available for under $400, making it the easiest and most affordable way to see eye-to-eye with the people who matter most.

Included in package	Supra Video Phone Kit™ 3000	Competitor "B"**	Competitor "C"**
Internet Dialing	yes	no	no
Point-to-Point Dialing	yes	yes*	yes
Video Capture Card	yes	yes	yes
Modem	yes	no	yes
Video Camera	yes	no	yes
Price	$399	$399	$999

*Requires V.80 modem. **Information gathered from Company's websites.

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Circle 79 on reader service card

PC WORLD

TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARD	Month tested	Street price (10/10/96)	Overall rating	PC WorldBench graphics score	Comments	Reader service number
1	ATI 3D Xpression+ PC2TV 905/882-2600 http://www.atitech.ca	NEW	$199	99	180 very good	**FEATURES:** 4MB of SGRAM, 150-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, ATI MPEG player, ATI Rage II chip. **PRO/CON:** 4MB of memory lets you see more colors at high resolutions, connects to a TV, excellent AVI and MPEG video, flawless installation; 3-D quality is merely okay.	744
2	Matrox Mystique 800/361-1408 http://www.matrox.com/mga	Dec 96	$179	98	181 very good	**FEATURES:** 2MB of SGRAM, 130-Hz refresh rate at 1024 by 768, 3-D acceleration, optional MPEG and TV tuner cards, Compcore MPEG software, DirectVideo, Direct3D, MGA-1064SG chip. **PRO/CON:** Best 3-D performance and quality, good AVI and MPEG video playback; refresh rates hard to set.	745
3	STB Lightspeed 128 888/234-8750 http://www.stb.com	Aug 96	$179	97	186 very good	**FEATURES:** 2.25MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bilinear video interpolation, DirectVideo, Xing MPEG software, Tseng Labs ET6000 chip. **PRO/CON:** Great bang for your buck, performs well in business and graphics programs, perfect AVI video playback, excellent MPEG, lifetime warranty; no 3-D acceleration.	746
4	VideoLogic GrafixStar 600 800/578-5644 http://www.videologic.com	Oct 96	$159	96	185 very good	**FEATURES:** 2MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bundled multimedia apps, Xing MPEG software, DirectVideo, Tseng Labs ET6000 chip. **PRO/CON:** Fast in business and graphics programs, inexpensive, excellent utilities, top-notch AVI and MPEG video; no 3-D acceleration.	747
5	Hercules Terminator 3D 800/532-0600 http://www.hercules.com	Dec 96	$189	96	184 very good	**FEATURES:** 2MB of EDO DRAM, 90-Hz refresh rate at 1024 by 768, 3-D acceleration, optional MPEG card, Xing MPEG software, S3 Virge chip. **PRO/CON:** Fast in Windows business applications, handles basic 3-D graphics well, excellent AVI and MPEG video playback, easy installation, toll-free support; poor documentation.	748
6	Matrox Millennium 800/361-1408 http://www.matrox.com/mga	June 96	$199	95	184 very good	**FEATURES:** 2MB of WRAM, 120-Hz refresh rate at 1024 by 768; optional MPEG and TV tuner cards, Compcore MPEG software, DirectVideo, MGA-2064W chip. **PRO/CON:** Fast, some 3-D acceleration, superb AVI video; watch for slower refresh rates in version shipped with some PCs.	749
7	Diamond Stealth 3D 2000XL 800/468-5846 http://www.diamondmm.com	Sept 96	$169	95	183 very good	**FEATURES:** 2MB of EDO DRAM, 100-Hz refresh rate at 1024 by 768; 3-D acceleration, bundled games, Mediamatics MPEG software, DirectVideo, S3 Virge chip. **PRO/CON:** Diamond's InControl Tools make changing video settings easy, excellent MPEG playback, flawless installation; tech support can be hard to reach.	750
8	Hercules Dynamite 128/Video 800/532-0600 http://www.hercules.com	Nov 96	$179	93	185 very good	**FEATURES:** 2MB of MDRAM, 90-Hz refresh rate at 1024 by 768, bilinear video interpolation, Xing MPEG software, DirectVideo, Tseng Labs ET6000 chip. **PRO/CON:** Handles business and graphics programs equally well, nice utilities, excellent AVI video playback, toll-free support; weak documentation, no 3-D acceleration.	751
9	Orchid Fahrenheit Video 3D 800/577-0977 http://www.orchid.com	Dec 96	$199	93	187 very good	**FEATURES:** 2MB of EDO DRAM, 110-Hz refresh rate at 1024 by 768, 3-D acceleration, optional MPEG and TV tuner cards, Xing MPEG software; S3 Virge chip. **PRO/CON:** Easy to install and use, good software and manual, fastest board by a hair; not so good with AVI video playback, poor MPEG quality.	752
10	Jazz G-Force 128 888/367-5200 http://www.jazzmm.com	NEW	$169	93	186 very good	**FEATURES:** 2MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bilinear video interpolation; Mediamatics MPEG player, Tseng Labs ET6000 chip. **PRO/CON:** Inexpensive, but powerful enough to handle graphics-intensive programs, excellent AVI and MPEG video; lacks some utilities, no 3-D acceleration.	753

Best Buy http://www.pcworld.com/t10graphics Windows 95-certified Plug and Play All products: 912

HOW WE TEST We tested PCI boards under Windows 95 with PC World8ench 1.0 at 800 by 600 resolution and 16.8 million colors (reported here) and at 1024 by 768 and 65,536 colors. Boards were tested in a Dell Dimension XPS P133c with 16MB of EDO DRAM and 256K of pipeline-burst secondary cache. Overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

YOU HAVE A BIG NEW MONITOR right under your nose and you probably don't know it. With ATI's new $199 3D Xpression+ PC2TV, you can use your television set as a monitor. The board also carries a lot of memory for the price. At the other end of the chart, the Jazz G-Force 128 debuts at number ten. It has impressive performance and excellent video playback, but its utilities aren't as comprehensive as other boards'.

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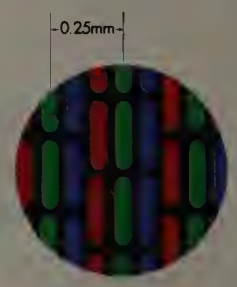

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Circle 206 on reader service card

PC WORLD

TOP 10 MODEMS

	EXTERNAL MODEMS	Month tested	Street price (10/10/96)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	U.S. Robotics Courier V.Everything 33.6 800/877-2677 http://www.usr.com	NEW	$275	82	2:42	**FEATURES:** 33.6-kbps, FlashROM, distinctive ring, Quicklink II fax/data software, password protection, callback. **PRO/CON:** Above-average performer, loaded with features, manual volume control, phone jack turns off during connect, great documentation; expensive, takes up a lot of room on your desk.	788
2	Hayes Optima 28.8 Business Modem Voice/Data/Fax 770/840-9200 http://www.hayes.com	retested this month	$259	79	2:31	**FEATURES:** 28.8-kbps, FlashROM, 230.4-kbps modem-to-PC speed, stores multiple profiles, SmartCOM Message Center LE voice/fax/data software. **PRO/CON:** Second fastest performer on the chart, toll-free tech support, Hayes will cross-ship replacement modem; trouble with graphics files, sparse manuals.	789
3	Motorola ISG Premier 33.6 800/566-3266 http://www.mot.com/mims/isg/	NEW	$300	78	2:28	**FEATURES:** 33.6-kbps, FlashROM, 230.4-kbps modem-to-PC speed, distinctive ring, stores 20 profiles, password protection, Quicklink II fax/data software. **PRO/CON:** Best performer on the chart, connected at 28.8 kbps or faster more than any other modem we tested, toll-free tech support; expensive.	790
4	U.S. Robotics Sportster 33.6 Data/Fax Modem 800/342-5877 http://www.usr.com	retested this month	$159	78	2:41	**FEATURES:** 33.6-kbps, phone jack turns off during connect, Quicklink II fax/data software. **PRO/CON:** Above-average performer, manual volume control, attractively priced, nice documentation, five-year warranty; comes with very few features—no security features, no storing multiple profiles.	791
5	Diamond Multimedia SupraSonic 336+ Voice Faxmodem 800/727-8772 http://www.diamondmm.com	NEW	$249	78	2:44	**FEATURES:** 33.6-kbps, FlashROM, MNP-10 cellular protocol, voice mail enabled, stores multiple profiles, distinctive ring. **PRO/CON:** Slowest performer on the chart, but average for all modems tested, comes with serial cable and a headset telephone, LCD English-language status display; no security features.	792
	PC CARD MODEMS						
1	Megahertz XJ4288 800/527-8677 http://www.megahertz.com	retested this month	$269	87	2:38	**FEATURES:** 28.8-kbps, MNP-10EC error control, FlashROM, built-in phone jack, 230.4-kbps modem-to-PC speed, digital line voltage protection. **PRO/CON:** Best performer, feature rich, thorough and easy-to-read documentation, even technophobes can install it, five-year warranty; most expensive unit on the chart.	793
2	Practical Peripherals ProClass 288 V.34 Data/Fax Modem with EZ-Port 770/840-9966 http://www.practinet.com	NEW	$229	85	2:42	**FEATURES:** 33.6-kbps, FlashROM, 230.4-kbps modem-to-PC speed, distinctive ring, stores multiple profiles, password protection, callback security, Quicklink II fax/data software. **PRO/CON:** Second fastest modem on the chart, built-in phone jack, lifetime warranty; installation was not as easy as we'd like.	794
3	TDK CyberExpress 3000 800/999-4835 http://www.tdksystems.com	NEW	$199	84	2:49	**FEATURES:** 33.6-kbps, MNP-10EC error control, distinctive ring, stores multiple profiles, 230.4-kbps modem-to-PC speed, Quicklink II fax/data software. **PRO/CON:** Nice price, toll-free tech support, digital line voltage protection with alert; slowest performer on chart and below average overall.	795
4	Zoom PCMCIA V.34C Plus Model 2870 800/631-3116 http://www.zoomtel.com	NEW	$199	84	2:47	**FEATURES:** 33.6-kbps, MNP-10EC error control, FlashROM, distinctive ring, stores multiple profiles, Win/DOS Fax Lite fax/data software. **PRO/CON:** Attractively priced, digital line voltage protection, seven-year warranty; no security features, middling performer, installation not recommended for novices.	796
5	U.S. Robotics Sportster PC Card Faxmodem with DataView Connector 800/527-8677 http://www.megahertz.com	NEW	$229	82	2:42	**FEATURES:** 28.8-kbps, includes a dongle—the DataView Connector—which shows power, send, receive, and online via an LED display, Quicklink II fax/data software. **PRO/CON:** Second fastest modem on the chart; not upgradable, no security features, sparse documentation, anemic overall features set.	797

Best Buy http://www.pcworld.com/t10modems Windows 95-certified Plug and Play All products: 914

HOW WE TEST We tested a pair of identical modems on a simulated phone network. For the phone line test, we sent a text file over 55 line conditions. For the file type test, we sent five files—graphics, text, program, and compressed file types, plus a mixture of these four types—over one line condition. We then averaged the results of the two tests. Overall rating is based on performance (43 percent), features (26 percent), price (12 percent), support (10 percent), and ease of use (9 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

NEW TESTS BASED on Windows 95 and an influx of new 33.6-kbps modems changed this month's modem chart almost completely. Our new number one external unit, the Courier V.Everything 33.6, is one of four modems on the chart that are updates of 28.8-kbps models. As we've found before, these new 33.6-kbps versions don't offer much performance gain. Our top PC Card: the 28.8-kbps Megahertz XJ4288, first tested in October. ■

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Circle 196 on reader service card

Spielberg Goes Digital, Dinosaurs Return

THERE GOES THE NEVERHOOD

CONSIDERABLE POPULAR anticipation and industry attention have been focused on DreamWorks Interactive, the multimedia arm of Steven Spielberg's new movie studio. Good news: **The Neverhood** delivers on the much-hyped company's big promises. The visuals alone are worth the price of admission. The environment and characters in this game for adults are made from three tons of clay, creating a stunning blend of puppetry, stop-motion animation, and technology that enhances the gaming experience (the game's video sequences are a bit sluggish, though). Your goal is to guide the hero, Klaymen, through some 60 puzzles in order to save the Neverhood from the evil Klogg, who has wrested control of the hood from the good-hearted Hoborg. Along the way, you battle monsters and robots with serious attitude. And watch out for those hungry Venus's-flytraps. —*Angela Freeman*

WORKS LIKE A DREAM: Claymation, stop-motion video, and amazing sets star in DreamWorks' The Neverhood.

PHOTOGRAPH: ROBERT CARDIN

The Neverhood

GRADE: **B+**; PRICE: $54.95 list; DreamWorks Interactive; 800/426-9400, http://www.dreamworksgames.com

READER SERVICE NO. 708

PRINTS CHARMING

GREETING CARDS, banners, posters—this is the stuff home PCs and color printers are made for. And now with the latest versions of Mindscape's **PrintMaster Gold** and Broderbund's **PrintShop Ensemble**, you'll find that you can practically turn your home into a corner Kinko's.

With its loose-leaf–style interface, Mindscape's PrintMaster Gold 3.0 is a breeze to use. Just click on a tab to start a printing project (card, poster, or the like), and then flip through the templates or build your own from scratch. The selection of graphics should satisfy even serious clip-art hounds. You can also download additional fonts and graphics free from Mindscape's Web page.

PrintShop, the grandparent of all home publishing software, is still the leader in flexibility and design options. Like PrintMaster Gold, PrintShop Ensemble III includes more than 1000 ready-made designs for just about any project. You can even generate related invitations, banners, and name tags.

If you want maximum creative options, PrintShop Ensemble III is the choice. If you're willing to sacrifice a little flexibility and variety for greater ease of use, it's PrintMaster all the way. —*Roberta Furger*

PrintMaster Gold 3.0

GRADE: **A-**. PRICE: $40 list; Mindscape; 800/234-3088, http://www.mindscape.com

READER SERVICE NO. 709

PrintShop Ensemble III

GRADE: **A-**; PRICE: $50 street; Broderbund Software; 800/521-6263, http://www.broderbund.com

READER SERVICE NO. 710

RADIO ACTIVE PCs

YOU'D BE CRAZY to spend $80 just to hear radio on your PC. But if you'd like to record shows, program the radio to switch to your favorite AM or FM stations at particular times, or display the artist's name and song title, then **Cadet** just might be playing your song. You can also tap into a free data service that transmits sports, weather, and financial news directly to your system via the Computer Radio Network. But you can't tune in to just any station; it must be affiliated with CRN. Installing this 8-bit ISA card is cumbersome. A PC Card version is in the works, however. Stay tuned.

—James Oliver Cury

Cadet

GRADE: **C+**; PRICE: $79 list; ADS Technologies; 800/888-5244, 310/926-1928; http://www.ads-mm.com

READER SERVICE NO. 711

TUNE IN, TURN ON: The Cadet brings AM and FM to your PC, as well as a free news service.

EDITED BY James A. Martin

DINO-MITE

DK MULTIMEDIA'S **Eyewitness Virtual Reality Dinosaur Hunter** is no simple jaunt through the tar pits. To get the scoop on your favorite four-legged stars from *Jurassic Park*, you must begin in the middle of a vast museum, clicking in and out of tunnels, exhibits, and hallways. Along the way, you stumble upon endless rooms, maps, skeletons, sounds, and videos, presented via timelines, index searches, games, and World Wide Web links. No details are omitted; icons pop up all over the place, offering pronunciations of dinosaur names; 3-D animations; magnifying glasses; video clips of historic excavations; and much more.

DINOS SOAR: DK's Virtual Reality Dinosaur Hunter is a 3-D exploration of all things big, scaly, and extinct.

As with the other titles in DK Multimedia's Virtual Reality series, the sheer volume of information can be overwhelming at times. Still, you'll marvel at the inventive way it's all presented.

—*James Oliver Cury*

Eyewitness Virtual Reality Dinosaur Hunter

GRADE: **A-**; PRICE: $30 street; DK Multimedia; 800/356-6575, 212/213-4800; http://www.dk.com

READER SERVICE NO. 712

F Y I

IN 1996, 37 percent of all online users were women; that translates into 13.9 million women online. And by the year 2000, women will represent nearly 47 percent of online surfers, or 43.3 million.

SOURCE: JUPITER COMMUNICATIONS/WOMEN'S WIRE SURVEY

COLLEGE DAZE

BEFORE YOU HEAD OFF to your future alma mater (and spend all that *e pluribus unum*), check out Princeton Review's **College Advisor '97 Edition** and **Inside the SAT and ACT '97 Edition**. College Advisor features the latest data on more than 1200 schools. Type in your GPA, test scores, and curriculum requirements, and you get a list of appropriate colleges, with links to their Web sites. A new Financial Aid advisor and Automatic Competitiveness rating help you find the most affordable schools.

Before you can become an Ivy Leaguer, though, there are those dreaded tests; would-be Yalies should find Princeton's Inside the SAT test guide enormously valuable. An animated interface reduces the intimidation factor; and the videos, cartoons, and interactive elements almost make test taking fun. *Almost.*

—*Glenn McDonald*

College Advisor '97 Edition

GRADE: **B**; PRICE: $20 street

Inside the SAT and ACT '97 Edition

GRADE: **A**; PRICE: $30 street

Princeton Review; 800/566-7737, http://www.review.com

READER SERVICE NO. 713

RENT CHECK

RUNNING OUT OF IDEAS about what to rent at the video store? Check out Corel's **All-Movie Guide 2**, covering some 100,000 films. Like Microsoft's Cinemania, Corel's CD lets you search for films by year, category, genre, even mood. The new version adds coverage of about 100 recent releases and includes free Internet updates, Web site links, and a fresh batch of movie stills. Although easy to navigate, the video store interface is unappealing and lacks Cinemania's polish. Nonetheless, Corel All-Movie Guide 2 will help you come up with lots of new rental choices. Of course, finding a store that has what you're looking for is another matter. —*Aoife McEvoy*

All-Movie Guide 2

GRADE: **B-**; PRICE: $25.95 list; Corel; 800/455-3169, http://www.corel.com

READER SERVICE NO. 714 ■

KEEPING UP

Crackdown in Cyberspace

AN ILLINOIS COMPANY that sold RAM over the Internet has agreed to pay $5500 in consumer redress after failing to ship in a timely manner—and sometimes not shipping at all. According to a complaint filed by the Federal Trade Commission, US Telemedia required payment in cashier's checks, leaving customers little recourse when their orders never arrived. The company is one of the first Web advertisers to be charged with violating the Federal Mail and Telephone Order Rule, which establishes guidelines for when products ordered online or via phone or mail must be shipped. The FTC reports that US Telemedia is no longer in business. Remember: Always pay with a credit card. If you think you've been scammed, contact the FTC (http://www.ftc.gov).

Disinformation, Please

LOOKING FOR alternative sources of information on the World Wide Web? Check out **Disinformation** (http://www.disinfo.com), a site that's sure to scare the wits out of every conspiracy theorist with an Internet account. There are links to everything from publications like Apocalypse Now (http://bbs.annex.com/relayer/an2.htm) to reports on the CIA crack connection and the impact of McDonald's business practices on the environment.

Tightwads Unite!

WHO SAYS YOU CAN'T get something for nothing? **Free...On the Web** (http://www.netutopia.com/freebies/index.html) has links to dozens of Web sites where you'll find such goodies as free telephone time, T-shirts, and Tupperware. You generally have to provide your name and address, which means that you'll probably end up with a mailbox full of flyers. But you could also get some free Jelly Bellies, Kona coffee, Post-it Notes, shaving cream, and more.

—Roberta Furger

ILLUSTRATIONS: J.D. KING

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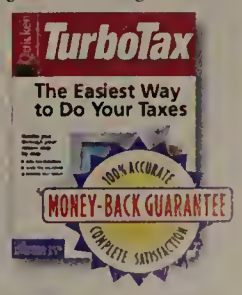

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TOP 5 HOME PCs

	SYSTEM	Street price (10/3/96)	Overall rating	PC WorldBench score	Reliability/ service rating	Setup rating	Comments	Reader service number
1	Dell Dimension P200v 800/388-8542 http://www.dell.com	$2299	78	202 very good	best/ best	fair	FEATURES: P-200, 16MB of RAM, 1.6GB hard disk, 8X CD-ROM drive, 28.8-kbps fax-modem, 15-inch monitor. PRO/CON: Your basic no-frills muscle machine with speedy performance at a very reasonable cost. Price here includes Microsoft Office Pro but no other software. Mail-order only, so best suited for experienced users.	702
2	Compaq Presario 4402 800/345-1518 http://www.compaq.com	$1999	76	153 satisfactory	best/ fair	very good	FEATURES: P-133; 16MB of RAM; 1.6GB hard disk; 6X CD-ROM drive; 33.6-kbps fax-modem with voice mail, speakerphone, DSVD; remote control for telephony and cursor; 15-inch monitor. PRO/CON: Very easy setup, great price, middle-of-the-road performance. Includes Microsoft Encarta and Quicken. A solid entry-level machine.	703
3	Micron Home MPC 800/223-6571 http://www.micron.com	$2799	76	215 outstanding	best/ best	good	FEATURES: P-200; 32MB of RAM; 1.2GB hard disk; 8X CD-ROM drive; 28.8-kbps fax-modem with voice mail; 17-inch monitor. Includes Microsoft Office Pro. PRO/CON: True power machine for home or home office. Nice software package includes Quicken, Microsoft Encarta, and MechWarrior 2. On the expensive side.	704
4	Gateway 2000 P5-166 Family PC 800/846-2000 http://www.gw2K.com	$2349	75	199 very good	fair/ good	good	FEATURES: P-166, 16MB of RAM, 2.5GB hard disk, 8X CD-ROM drive, 17-inch monitor. PRO/CON: Very fast, good price, big hard drive and monitor. Available only through mail order. Gateway 2000's so-so reliability rating and phone-based support make this a system for the confident user.	705
5	Nexar 9000 508/836-8700, 888/639-2722 http://www.nexarpc.com	$2199	75	188 very good	[1]	fair	FEATURES: P-166, 16MB of RAM, 1.2GB hard disk, 8X CD-ROM drive, 28.8-kbps fax-modem with voice mail. PRO/CON: Easy access to the CPU, memory chips, and hard disk makes for quick upgrades; very fast performance; nice price. So-so software package does include Infopedia 2.0.	706

Best Buy http://www.pcworld.com/top5soho All products: 908

HOW WE TEST The overall rating is based on reliability and service (30 percent), price (20 percent), PC World8ench performance (20 percent), setup (10 percent), compatibility (10 percent), and extra features (10 percent). Reliability and service ratings are based on results of PC World's Reliability and Service Monitor survey. [1]Insufficient data.

THE MARRIAGE OF CONSUMER electronics and personal computing moves a step closer this month with the arrival of sleek new home PCs from Sony and Toshiba. But despite solid performance and some nice features, weighty price tags kept both machines from cracking our Top 5. No other new machines made it either, so the honors this month go entirely to former winners.

At the top of the chart once again is the Dell Dimension P200v. This bare-bones muscle machine offers P-200 performance at an affordable $2299.

Just below the Dell are Compaq's Presario 4402 and Micron's Home MPC. Easy to set up and priced at a rock-bottom $1999, the 4402 is a great choice for first-time buyers who don't require great speed. The Micron, on the other hand, is a speed demon, scoring an astonishing 215 on our WorldBench tests. Rounding out the Top 5 are Gateway's Family PC, which provides quick performance and great value, and the Nexar 9000, which graced the Top 5 back in November, lost out to faster machines in December, but returns now thanks to a $100 drop in price.

PC by Sony may sound like a designer cologne, but that line's PCV-90 is a solid Pentium-200 system that offers excellent performance, 32MB of RAM, a 2.5GB hard drive, a sizable software package, and superlative software MPEG playback. It sports one of the better user interfaces we've seen and is ridiculously easy to set up. But the PCV-90 also comes with a designer price: $3478 when equipped with the 15-inch monitor.

Toshiba's Infinia 7200 tries to be both computer and home entertainment center, but this $3548 Pentium-200 is just too expensive. In addition to its 32MB of RAM, 3GB hard drive, and a 17-inch monitor, the Infinia includes a cable-ready TV/FM radio card. The system is easy to set up and comes with Encarta 96, Quicken, and Mayo Family Clinic. If you're looking for a solid computer and happen to need an extra television in the den, the Infinia is definitely worth a look. (For additional information on both Sony's PCV-90 and the Toshiba Infinia, see this month's Top 100).

—*Kirk Steers*

TOSHIBA'S INFINIA 7200 proved too expensive to make the Top 5.

Kirk Steers is a contributing editor for PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

ILLUSTRATION: JEFFREY PELO

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Nightmare on ISDN Street

I TOOK A CLOSE LOOK at my ISDN phone bill a while back, thereby opening up a huge can of worms that took me nearly a year to sort out. The good news is, I eventually ended up with a faster hookup and an enormous refund.

If you're not familiar with ISDN, it's an astonishingly fast two-channel digital communications line capable of transmitting data at 128 kbps. How fast is that? It takes a standard 28.8-kbps modem 45 minutes to download a 9MB file. Going all out on a properly functioning ISDN line, you can get the same file in 8 minutes flat.

My story starts in August 1995, when I ordered an ISDN line from Pacific Bell (see the January 1996 *Home Office* for sordid details). I specified residential service—that's critical to this horror story—because its installation and monthly charges are cheaper than for a business line. For example, with a residential account, your evening, weekend, and holiday calls are free. With a business account, you're stuck paying by the minute around the clock.

OVERCHARGED

WHEN I LOOKED at the November 1995 bill, I realized I was being charged for evening calls that should've been free. Yep, Pac Bell had me on their rolls as a business service. It took a week and a half-dozen calls just to track down a Pac Bell person who could help me. I explained, she listened, and we agreed—I should be switched to residential service.

And how hard could that be? You'd think she could just click an option in a dialog box. But why make things simple? Pac Bell had to terminate my service and make me wait three weeks before a technician could come to my house to install my "new" residential ISDN line.

To add insult to injury, my next Pac Bell bill contained a fee for canceling my business service and a charge for a new service installation. All told, I'm hit for $175. (Why am I not surprised that Scott Adams, creator of *Dilbert*, used to work in Pac Bell's ISDN group?)

I'm now faced with a monumental task: getting reimbursed. See, on one hand, Pac Bell is promoting the dickens out of ISDN. On the other hand, it doesn't have the staff to handle new orders, much less deal with problems. Any time I might have saved with a fast ISDN line was lost waiting on hold (while being told how very important my call is), explaining the problem, and faxing a copy of my bill to a Pac Bell rep. I wait a month. Nothing. I call again. I'm asked to send yet another copy of the bill. Now they want me to fax the bill again, this time to a long-distance phone number.

> Any time I might have saved with a fast **ISDN** line was **lost** waiting on hold, explaining the **problem**, and faxing a copy of my bill.

It takes two months, I finally receive a refund of—get this—$27. I get the feeling Dilbert's pet Dogbert must be in charge.

NO CONNECTION

IN THE MEANTIME, my ISDN line goes dead. A Pac Bell technician comes out to the house. He looks things over and fixes the problem. Then with a flourish worthy of Houdini, he plucks something from the gray telephone box and shouts, "Aha!" I hate it when repair people say that. It turns out I have something called a Maintenance Test Unit attached to my ISDN line. An MTU is a circuit board that allows the phone company to test your line automatically. The repair guy, much too perky for his own good, tells me an MTU is for analog lines only. Pop it on a digital line and you get a 50 percent performance decrease. And I've had one on for well over a year. Swell.

I talked with three Pac Bell employees and learned that MTUs are standard equipment. What's troubling—and true not only in California—is that because the ISDN market is a burgeoning industry, most technicians are overworked and many aren't adequately trained. The chances are high they'll forget—or not know—that the MTU should be removed from digital line installations. So hang around while your ISDN line is installed, question the installer and, most important, ask them to hand you the MTU before they leave.

Well, it took a year and more than 5 hours on the phone with assorted Pac Bell representatives, but I finally received a refund: a whopping $518. My ISDN connections are now faster than a speeding bullet. And the folks at Pac Bell? They can leap tall buildings for all I care.

FasTrak Home ISDN

Pacific Bell; 800/472-4736, http://www.pacbell.com/products/business/fastrak

READER SERVICE NO. 707

Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 12 for contact information. ■

ILLUSTRATION: J. D. KING

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*According to PC Data, Reston, VA, 7 out of 10 people buy Family Tree Maker over other family tree programs (Jan-Jun 1996). Available now for Windows 3.1 & Windows 95. Macintosh version available early 1997. Features vary according to platform and price. Accessory CDs sold separately. © 1996 Broderbund Software, Inc. All products are trademarks of their respective holders

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HERE'S HOW

REAL PROBLEM. REAL SOLUTION

We get plenty of requests from our Web site—how can we respond best? —*David Jaworski*

DAVID JAWORSKI, whose company offers interactive software for personal and professional growth, found a way to turn hits on his Web site into sales leads—and to respond quickly.

PROVIDENT VENTURES, a developer and publisher of interactive multimedia training CD-ROMs in Bellevue, Washington, had no problem creating a Web site. But then Provident faced a real challenge: turning all those electronic queries into serious sales leads.

—*Editor*

IF YOU BUILD A CORPORATE Web site, visitors will come.

But if you want to turn your site into an effective sales and marketing tool, you must capture information about the people who visit. And you need an automated, effective way to respond to those leads.

When my company put up its Web site a year ago, our goal was simply to disseminate information about our products. (We produce interactive training, professional development, and self-improvement programs and seminars for CD-ROM and the Internet.) That proved successful. Today, many of our customers find us through our Web site (http://www.provident.com).

But we soon found that it's one thing to get people to visit your site and another to reach them proactively. So we changed our site from a simple online brochure to an interactive marketing and sales vehicle.

The goal was to solicit Internet inquiries in an ongoing "relationship marketing" effort and increase our current database of 3000 names to 50,000 by year's end.

PROBLEM: FOLLOWING UP ON CUSTOMER REQUESTS EFFICIENTLY

WE BEGAN OFFERING a free electronic newsletter on the Web site. By filling in a simple HTML form and e-mailing it back to us, people could receive monthly information on personal and professional development topics such as stress management and team building.

We immediately ran into big problems.

The first was collecting the e-mail on our Internet service provider's server. Of course, we wanted to respond immediately to people's requests for information. Several times a day, an employee or a contractor had to log on to the ISP's server and check the site for queries. We wanted our e-mail forwarded automatically to our own internal Microsoft Exchange e-mail system, but we didn't want to spend thousands of dollars on a programmer, and our ISP didn't want to install custom applications on its servers.

A second problem was getting the information from the customers' e-mail into a form suitable for WinSales, our sales automation database. Retyping the prospects' names and addresses into WinSales took one employee two days per month and introduced errors.

The final problem was getting WinSales to respond automatically to all the e-mail. Within four months, we'd accumulated more than 1000 queries. We needed to follow up these requests with calls or letters, but we were often too busy.

SOLUTION: E-MAIL CONVERSION AND SALES AUTOMATION SOFTWARE

OUR SOLUTION CAME in the form of Universal Outbox, an Internet-enabled companion to WinSales. Running on a Windows PC in our office, Universal Outbox captures the HTML-based data from

PHOTOGRAPH: GEOFF MANASSE

a Web site visitor, then translates the data into an ASCII text file that we can import into our WinSales database.

The process works like this: After the prospect fills out the form and clicks the Submit button, the form arrives on our ISP's server as an e-mail attachment. At regular intervals, Universal Outbox's E-mail Scanner automatically logs onto the ISP server and grabs e-mail from an account dedicated to these customer responses. (We set up the "fetching" schedule using the System Agent scheduling application that comes with Windows 95's Plus sidekick.)

E-mail Scanner opens a message, scans it for an attachment, and translates relevant data into a text file. From there, we can import the information into our WinSales sales automation database.

Next, we use WinSales to sort the prospect information by the action required. For example, if ten visitors to the Web site want to receive a printed information packet, the program triggers an action plan, telling us how many packets of information to send out, to whom, and when to follow up. This ability to automatically cover the next step in the process is a blessing in a small company like ours. (We set up the triggers in a program resembling Visual Basic that comes with WinSales.)

> 'If you want to turn your site into a real sales and marketing tool, you must capture information about the people who visit.'

When we're ready for our paper mailings, we power up WinSales and import the records; WinSales does the rest. All we do is print and mail out the letters. When we import the records, WinSales automatically fires out information via e-mail to anyone who requests it that way, so all our work is essentially done in one step.

But Universal Outbox isn't perfect. It supports only MAPI, so if your e-mail system isn't MAPI-compliant, you'll have to deal with workarounds.

We'll face another challenge in a few months as we start handling product purchases on the Web site. E-mail coming to us through the Universal Outbox is not secure, so we'll let people know that they can fax or call if we're asking them for a credit card number.

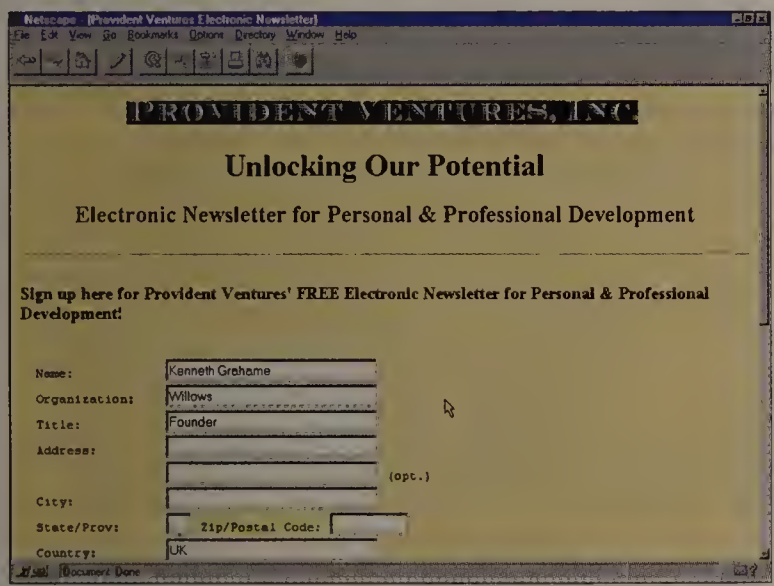
Overall, the Universal Outbox/WinSales technology replaces the equivalent work of a couple of people and improves service to our customers.

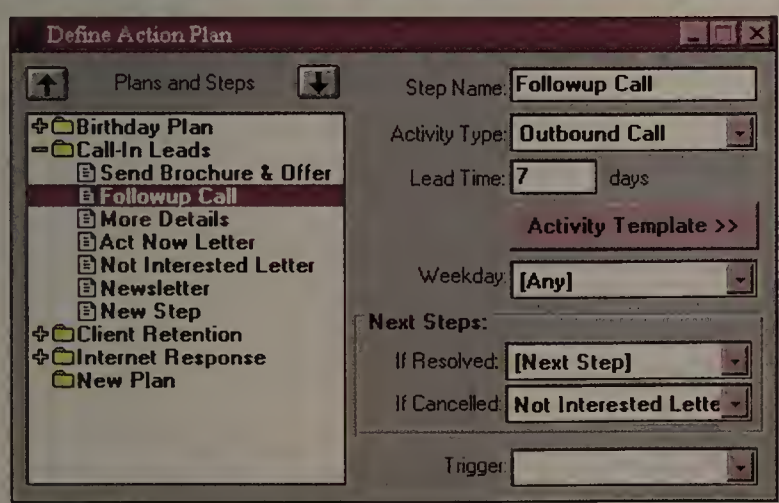
And our Web site stands out from the crowd, because we respond quickly and correctly to customer queries.

• Universal Outbox $1495; WinSales Corp.; 206/747-2464, http://www.winsales.com

READER SERVICE NO. 620

Edited by Bronwyn Fryer





UNIVERSAL OUTBOX'S E-MAIL SCANNER captures data picked up in an HTML form (above) and then translates it for use in the WinSales sales automation program (below).

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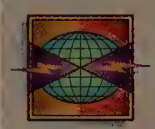

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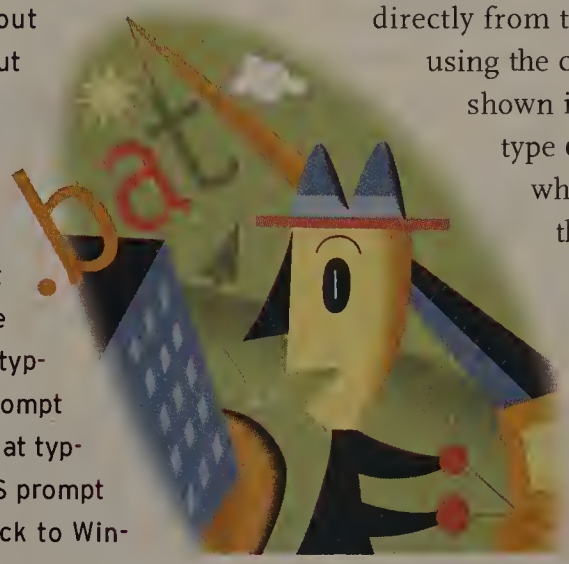
Bronwyn Fryer is a PC World *contributor. If you use PCs to manage people and other resources in a business environment, we want to hear from you. We pay $300 for published columns. See page 12 for contact information.*

Batch file primer ◆ Measuring a megabyte ◆ Printing on small envelopes

BATCH FILES FROM THE GROUND UP

I'VE SEEN MANY articles about batch files, but they all assume that the reader is familiar with DOS commands. About the only thing I know about DOS is that some games require it, that typing WIN at the DOS prompt starts Windows, and that typing EXIT in an MS-DOS prompt window takes you back to Windows. Even simple instructions, such as 'save it in a directory' or 'insert a batch file line,' are completely foreign to me. Could you explain, step by step, how to write, save, modify, and use batch files?

Phil Rabitchow, Tarzana, California



BATCH FILES ARE simply text files that contain one or more DOS commands, each followed by a return. They can be very handy for automating common tasks—for example, deleting all files of a given type in a given folder.

Creating a batch file is easy. In any version of DOS starting with 5.0 and including Windows 95's various DOS command prompts, enter **edit** at the prompt to fire up Microsoft's bare-bones text editor (see **FIGURE 1**). Enter your batch file commands, choose *File•Save*, and then give your batch file a descriptive name ending with the **.bat** extension.

Alternatively, you can create batch files directly from the DOS prompt by using the copy command (also shown in Figure 1). Simply type **copy con: filename.bat** where *filename.bat* is the name of the batch file you want to create, and then press **<Enter>**. Type the batch command lines just as you would in a text editor, pressing **<Enter>** after each line. When you finish entering commands, press **<F6>** to insert the end-of-file character on the last line, and press **<Enter>** again to create the file. You should see the message '1 file(s) copied'.

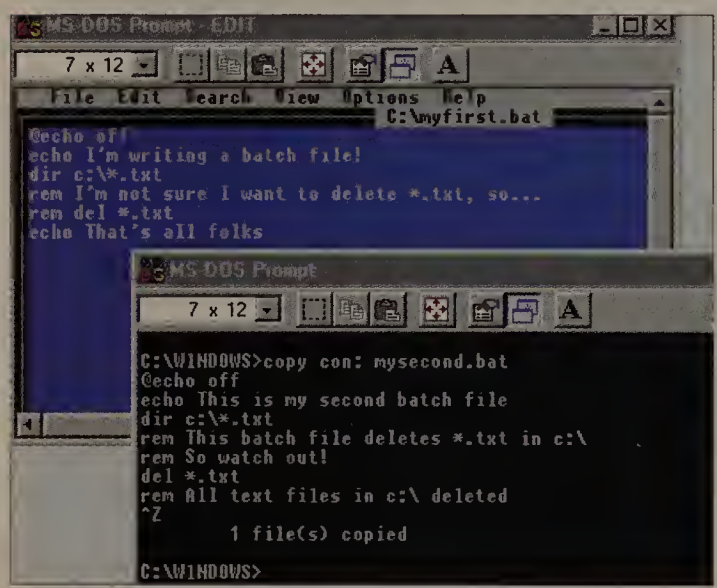


FIGURE 1: CREATE BATCH FILES in DOS or Win 95—enter commands in DOS Edit or use Copy at the command prompt.

To test your new batch file, type the file name, with or without the .bat extension, at the DOS prompt and press **<Enter>**. The commands you placed in the batch file should execute one after another, just as if you entered them individually at the DOS prompt.

That's how you create batch files, but what do you put in them? If you're still using MS-DOS 5.0 or 6.*x*, type **help** at the DOS prompt for a nifty program with hypertext links that describe each command and give examples of how to use it.

Windows 95 lacks the hypertext reference program, but you can get detailed help on individual commands by entering **command /?** at the command prompt in a DOS window, where *command* is the DOS command you want to know more about.

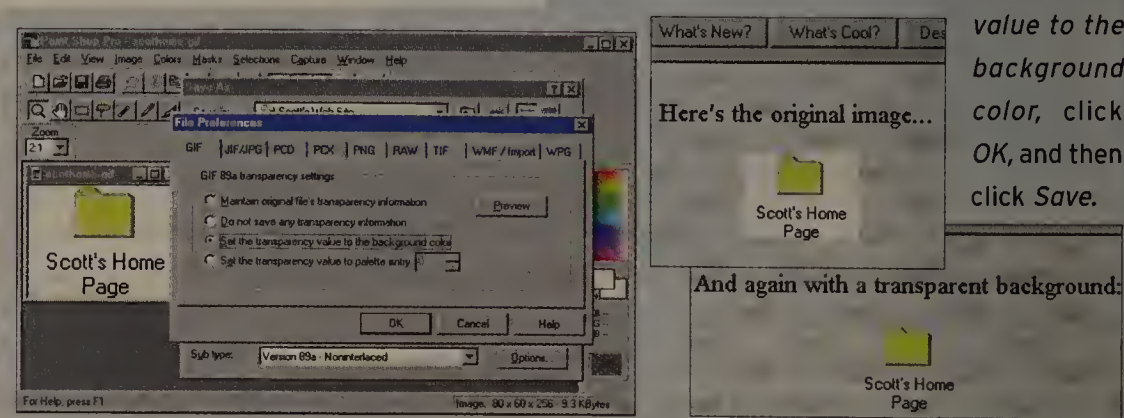
You'll also find a complete list of available commands in the Windows 95 Resource Kit. If your copy of Windows 95 came on CD-ROM, you'll find the Resource Kit in Windows' help file format. Look for the win95rk.hlp file in the Admin/Reskit/Helpfile directory. If you lack the CD-ROM, download the 2.2MB help file from Microsoft's Resource Kit Tools Web page (http://www.microsoft.com/windows/software/reskit.htm).

Once you locate the file, open Explorer, double-click the file, and click *Index*. Enter **command-line commands:native** in the first field, and double-click *native Windows 95 commands* in the second box to view the page listing Win 95's commands. Enter **command-line commands:batch** for a list of commands used only in batch files for program flow control and branching, and for interaction with the user. ▶

Get Transparent GIF Backgrounds With PaintShop Pro 4.1

PaintShop Pro 4.1 (download from http://www.jasc.com/), the $69 alternative to Adobe Photoshop, has many talents. One is the ability to create GIF files with transparent backgrounds, a must for Web graphics that you want to blend with color or wallpaper backgrounds.

To add transparency information to your GIFs in PaintShop Pro, open the file, change the image background color to the color you want to make transparent by clicking the background color swatch at the right side of the screen, then selecting the new color from the resulting palette dialog box. Choose *File•Save as*, select GIF from the 'Save as type' list, and click *Options*. Then select *Set the transparency value to the background color*, click *OK*, and then click *Save*.



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Circle 3 on reader service card

TRUE MEASURE OF A MEGABYTE

I RECENTLY BOUGHT a new system with an 850MB Quantum Trailblazer hard drive. When my PC boots, it says 'Hard Disk 0 Quantum TRB 850A Installed', so I know it's got the right drive and the drive is working properly. But when I examine the drive's properties in Windows 95's Explorer or run the chkdsk utility in DOS, both report the drive's capacity as about 810MB. What happened to the other 40MB?

Kevin Anthony, Dix Hills, New York

THEY WERE NEVER there, except in the minds of Quantum's marketing staff. Like many disk drive makers, Quantum defines a megabyte as 1 million bytes. Check the fine print at the company's World Wide Web site (http://www.quantum.com/products/trailblazer/#note).

Most of the rest of the world and most disk-management tools define a kilobyte as 1024 bytes and a megabyte as 1024 kilobytes, or 1,048,576 bytes. Divide 850,000,000 (the size of your drive in bytes by Quantum's calculations) by 1,048,576 and you get about 810, the real capacity of your drive.

ONE LAST STEP TO A PASSWORD BUG FIX

I WAS EXCITED to read about the Windows 95 password cache patch [*Bugs and Fixes*, September 1996] because, of course, the bug is happening to me. However, when I downloaded and installed the patch, the problem remained.

Michael A. Cuttler, Sarasota, Florida

THE PROBLEM IS, your password cache file has already been corrupted by the buggy password caching module in Service Pack 1, so you can't store new passwords there even though you installed the fix. You can find the fix on Microsoft's Win 95 Updates page (http://www.microsoft.com/windows/software/passwd.htm).

The simple solution is to delete the password file and start over. You'll have to reenter any cached passwords to remote shares or servers the next time you access them, but this should be a one-time inconvenience. To delete the file, choose *Start•Find•Files or Folders*, enter ***.pwl** in the 'Named' field, and **c:\windows** (or the directory where you have Windows 95 installed, if different) in the 'Look in' field; then click *Find Now*. Delete any files found, and restart Windows 95.

If your Windows log-in password is blank (which lets you skip the log-in dialog box), you'll have to reconfirm the blank password at this time; subsequent log-ins will revert to hands-off mode. Now, when you enter a Dial-Up Networking password and check *Save password*, Windows 95 will save it in a new, uncorrupted password cache file.

PRINT ON ITTY-BITTY ENVELOPES

I HAVE AN HP 855Cse ink jet that does a fine job printing addresses on business-size envelopes, but it won't handle 6.5-by-3.625-inch envelopes. It seems they're too small to travel through the paper feed mechanism. Is there a trick that will let me print on small envelopes?

Bill Petty, Wilmington, North Carolina

I PICKED THIS TRICK UP from a graphic designer friend: If your envelope is too small to travel through the printer by itself, let it hitchhike through on a larger piece of paper.

Set up the program you're printing from to print addresses in portrait orientation in the upper middle of an 8.5-by-11-inch page. Then send the envelope through with its flap hanging over the top edge of a sheet of letter-size paper. You have to feed each envelope by hand, and I can't guarantee this will work with every printer, but it's probably faster and certainly produces better results than using labels.

Find additional tips at http://www.pcworld.com/hereshow.html. Answer Line welcomes your questions and tips and pays $50 for published items. Scott Spanbauer is a contributing editor for PC World *and the author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240). See page 12 for contact information.* ■

The Absolutely Ultimate Windows 95 Send To Tip

IF YOU'RE ONE OF THOSE Send To junkies, here's a quick way to add destinations to the Send To menu. The trick is simply to add a Shortcut to the SendTo folder by following these steps:

1. Start Windows Explorer.

2. Open the \Windows\SendTo folder.

3. Hold down the right mouse button while you drag the SendTo folder from the left pane into the right pane, and then release the mouse button.

4. Choose *Create Shortcut Here* from the resulting pop-up menu.

Now, when you want to add a program to the SendTo folder, right-click the program in Explorer and choose *Send To•Shortcut to SendTo*. Next time you right-click an object in Explorer and select Send To from the pop-up menu, the new destination will appear.

Hani Musallam, New York

Editor's note: This tip really sends me. But don't try it with folders. Instead of creating a Shortcut to the folder in the \Windows\SendTo directory, it moves the entire folder and its contents there. To add a folder to the Send To menu, use Musallam's drag-and-drop method, or open the \Windows\SendTo folder in Explorer, right-click the right pane, choose *New•Shortcut*, enter the folder's path in the Command line field, click *Next*, then *Finish*.

If you employ your new Shortcut to SendTo frequently, your Send To menu will quickly balloon out of control. When it does, simply create subfolders (as shown in **FIGURE 2**) under \Windows\SendTo, and organize those Shortcuts to your heart's content. And if you just can't get enough Send To tips, check this month's *Windows Tips* for more.

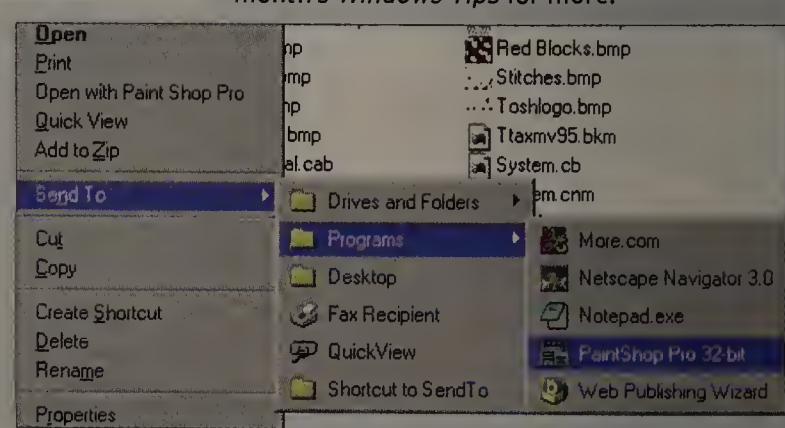

FIGURE 2: ADD DESTINATIONS TO THE SEND TO MENU in a snap by making the SendTo folder itself a Send To destination. When Send To items pile up, organize them into subfolders.

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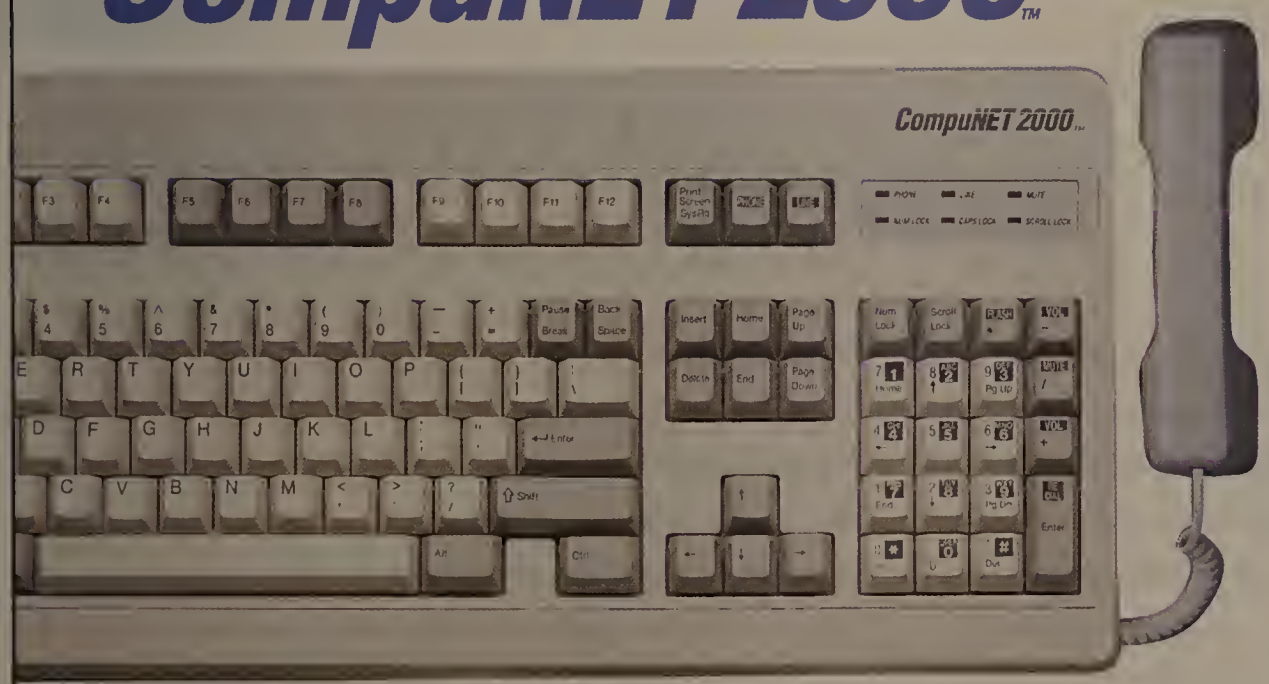

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SURE, A MONITOR SHO
BUT IT'S WHAT'S ON T

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The Compaq V70 monitor won both the PC Magazine Editors' Choice award and the Windows Magazine Best award in October 1996. The Compaq QVision 210 monitor won the PC World Best Buy award in January and November 1996. * When used with Compaq CPUs which feature Intelligent Manageability. © 1996 Compaq Computer Corporation. All rights reserved. Compaq registered U.S. Patent and Trademark Office. QVision 210 is a trademark of Compaq Computer Corporation. Other products mentioned may be trademarks or registered trademarks of their respective companies.

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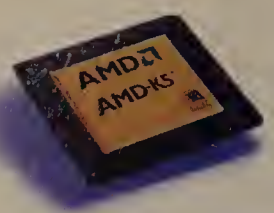
Circle 35 on reader service card



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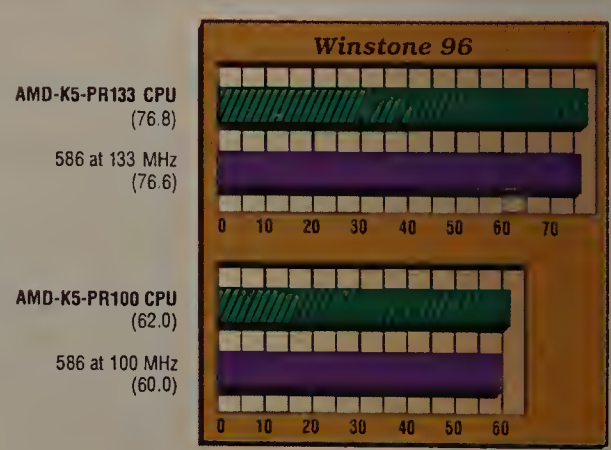
The P-Rating of an AMD-K5 processor is determined in an "apples to apples" system-level comparison. PC system manufacturers utilize this methodology, for consistent/objective rates on Pentium-relative performance for Windows applications. And the P-Rating helps end users understand true processor performance equivalences while making their PC buying decisions. For example, if an AMD-K5 processor offers the equivalent performance of a 100-MHz Pentium, it receives a P-Rating of "PR100".



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Reorganize Send To menu ◆ Colorize Schedule+ ◆ Minimize application icons

Faster PostScript Printing

THE POSTSCRIPT printer description language is a standard in the desktop publishing world—but a speed demon it ain't. If you have a PostScript printer connected directly to your computer (not to a network), you can make it print faster by sending the header code to the printer only once rather than at the beginning of every job.

Here's how: Make sure the printer is turned on. In Windows 3.*x*, open Control Panel and double-click *Printers*. Select your PostScript printer in the list of Installed Printers, and click *Setup*. Next click *Options*. In the Options dialog box, click *Send Header*. In the Send Header dialog box, confirm that *Printer* is selected, and then click *Send Now*. Uncheck *Send Header with Each Job*, click *OK* twice, then click *Close*.

In Windows 95, choose *Start•Settings•Printers*. Right-click your PostScript printer, and choose *Properties* (or select it and press **<Alt>-<Enter>**). Click the *PostScript* tab, and click the *Send Header Now* button (if it's dimmed, select *Download header with each print job*). Click *OK* to confirm. Make sure that the radio button 'Assume header is downloaded and retained' is selected. Then click *OK*.

The header will now be lodged in your printer, and each print job should come out a little faster. But any time you restart the printer, you'll have to repeat this process of sending the header to the printer. To automate that step, see the next tip.

DOWNLOAD POSTSCRIPT HEADER AUTOMATICALLY

HERE'S HOW TO automate the task of sending your PostScript header code to the printer. First you'll need to create a file on your hard drive that contains the header code.

In Windows 3.*x*, open the Send Header dialog box as described in the previous tip. Select *File*. Type a name and location for your header file (for example, **c:\windows\header.ps**). Click *Send Now*.

In Windows 95, open the Properties sheet for your PostScript printer, which must be set as the default printer. Click the *Details* tab and make a note of the current setting in the 'Print to the following port' drop-down list. Click that drop-down list, choose *FILE: (Creates a file on disk)*, and click the *Apply* button at the bottom of the dialog box. Then click the *PostScript* tab, select *Download header with each print job*, click *Send Header Now*, and click *OK* to confirm.

In the Print to File dialog box that appears, select a folder for your header file and type a name for it (such as **header.ps**) and click *OK*. Back in the PostScript Properties dialog box, make sure the radio button 'Assume header is downloaded and retained' is selected. Then click the *Details* tab, click the *Print to the following port* drop-down list, and set your printer back to its original port. Click *OK* to close the Printers window.

Now the header code that the printer needs is on your hard drive. You'll have to send the code to your printer each time you turn it on. To automate that process in Win 3.*x* and 95, open a DOS window and type **copy /bc:\windows\header.ps lpt1:** where *c:\windows\header.ps* is the name of your header file and *lpt1:* is the port your printer is connected to. If you start your printer and computer only once a day, just add the line to your autoexec.bat file. Don't forget to turn on your printer first so it will be ready when autoexec.bat sends the file.

SEND IT WHERE YOU WANT IT

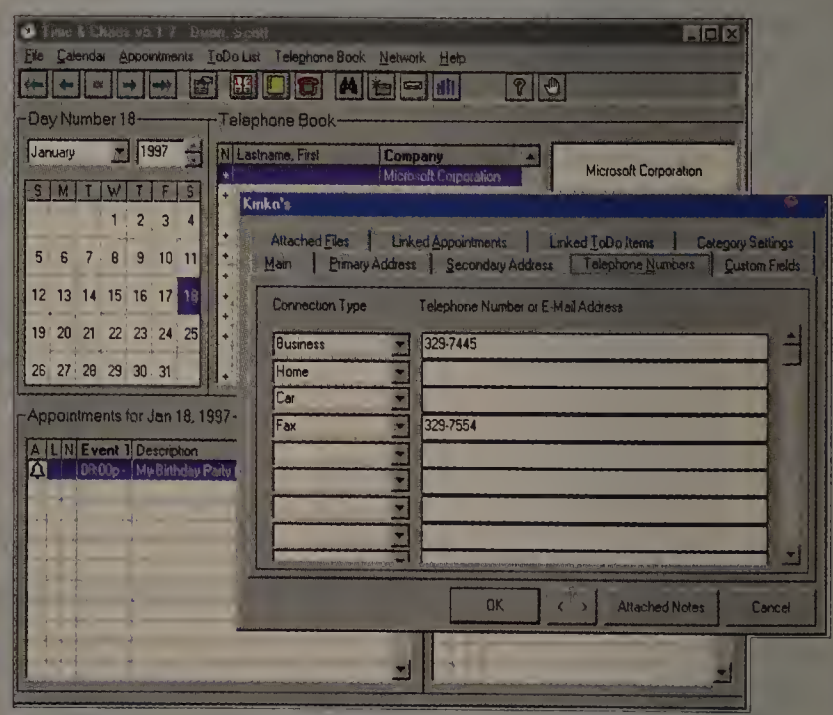
RIGHT-CLICK ON any file in Windows 95, and one of your options will be Send To. This menu is a boon—you can load it up with Shortcuts to oft-used folders, network drives, batch files, printers, file viewers, and more. (See "The Absolutely Ultimate Windows 95 Send To Tip" in this month's *Answer Line* to learn how to add items to the Send To menu.) But after adding a dozen or so goodies, things start getting cluttered. Here are some tips for organizing your Send To menu.

First, figure out logical groupings for the items in your Send To menu. Clustering similar items can help you find things faster when push comes to crunch. To rename Send To items as suggested ▶

WINDOWS TOOLBOX

Try a Slim PIM

THE VENERABLE SHAREWARE personal information manager, Time & Chaos, is now available in a 32-bit version for Windows 95 and Windows NT. The program retains its clean-and-simple approach to appointment and contact management. Registration is $45. Available as Chaos32x.exe on PC World Online. Contact iSBiSTER International at 214/495-6724, sales@isbister.com, or http://www.isbister.com.



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How to Improve Your OCR Accuracy and

Caere Corporation (NASDAQ: CAER) recently announced an upg
that makes the OmniPage Pro optical character recognition (OCR)
major software resellers for an estimated street price of only $129.
vide an inexpensive way for scanner users to step up to fully-featu
OCR product (including those bundled with flatbed and edge feed
products) can upgrade to the full version of OmniPage Pro at a $3

OmniPage Pro has a separate upgrade package available through m
Computer City, Egghead, and Best Buy. Since the vast majority of
Caere OCR, most scanner users are eligible to upgrade at this gre

The large number of scanner manufacturers that bundle Caere OCR
Microtek, Canon, Plustek, Umax, Nikon, Agfa, Logitech, Relisys
are eligible for the upgrade.

The upgrade program includes OmniPage Pro 6.0 (Windows 3.1 a
7.0 (Windows 95), which offer all the capabilities of the bundled ve
tures for extended functionality. Most notable among them are high
the "zoning" and preprocessing of scanned images, verifiers for the
Page technology for the retention of the original page formatting, a
as OCR training and deferred processing capabilities.

The Changing OCR Market: In the not so distant past, OCR require
ware and OCR software that was often difficult to use and provided
These issues were frustrating and limited the use of OCR to high v
sive vertical markets. The use of desktop OCR was limited to the "

"Today, several trends are contributing to the widespread use of OC
OCR users faced," said Chad Kinzelberg, Caere's vice president of
program is another major factor that will promote the use of OCR,
occasional OCR user will find Caere software more attractive becau

Analysts following the OCR market agree that OCR use is on the r
industry trends promoting its mainstream adoption:

Higher Customer Awareness: An increased number of computer use
time and money saving benefits it provides.

Higher Scanner Penetration: Scanners prices have dropped drastical
many flatbed grayscale scanners available for under $500. Also, att
(such as the small-footprint sheet-fed scanners) and multifunction d

Increased OCR Accuracy: OCR developers have developed high o
stage to the mainstream adoption of OCR. Pricing and Availability:
and Mac) and WordScan Plus 4.0 (Windows) upgrade packages are
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scanners are being used
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CR Market:
past, OCR required
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rtical markets. The use
limited to the "early

s are contributing to
of OCR that overcome
sers faced," said Chad
ice president of market-
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trends promoting its
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r Awareness:
r of computer users
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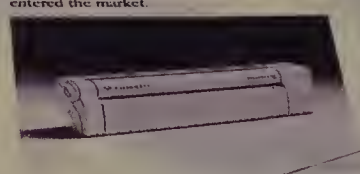
vides.

Higher Scanner Penetration:
Scanners prices have dropped drastically in the last few years with many flatbed gray-scale scanners available for under $500. Also, attractive, new scanner form factors (such as the small-footprint sheet-fed scanners) and multifunction devices have entered the market.



Low cost scanners entering the market have helped push OCR use to a new level

Increased OCR Accuracy:
OCR developers have developed high accuracy OCR technology for increased output. The greatest improvement has been made on degraded and hard to read documents.

Pricing and Availability
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The Company:
Caere Corporation, with U.S. headquarters in Los Gatos, Calif. and European headquarters, Caere GmbH., in Munich Germany, is a leader in OCR technology and desktop document management products. Caere has recently expanded its product line of OCR

continued on next page

OmniPage Limited Edition

OmniPage Pro

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Sure, the OmniPage Limited Edition OCR that came with your scanner is good. In fact, that's why scanner makers like HP, Microtek and Agfa chose it above all others.

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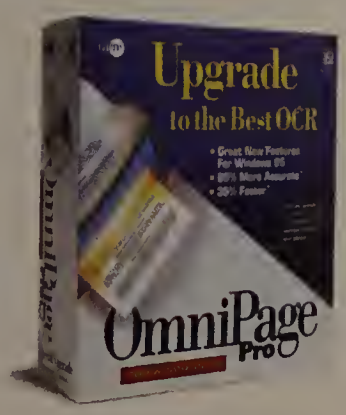

It integrates seamlessly with your favorite applications like Word, WordPerfect and more. It even guides you through the OCR process using its AutoOCR Toolbar. All with the simple push of a button.

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Key Feature Comparison	OmniPage Pro	OmniPage Limited Edition
Caere's fastest and most accurate OCR engine	✔	
AutoOCR Toolbar™ for easy, one-button OCR processing	✔	
OCR Wizard to guide you through the process	✔	
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OCR from within your favorite applications	✔	✔
Retains original layout	✔	

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by the tips below, open the Windows\SendTo folder in the Windows Explorer, right-click each item, and select *Rename* from the pop-up menu before proceeding.

1. Force your Send To menu to accept the order and grouping you want by renaming each to begin with a number or single letter. The menu shows items in alphabetical order, so your icons will be rearranged according to these new names, with numbers appearing first.

2. You can force a grouping of Shortcuts by putting an unobtrusive character at the beginning of the names of the items that you want to appear together. Windows ignores the space and most punctuation characters when alphabetizing, but will sort certain extended characters before alphabetical characters.

Here are the special characters, listed in the order that Windows will use to alphabetize them. For each one, make sure <NumLock> is on and use the numeric keypad: **<Alt>-0160** (blank), **<Alt>-095** (underscore), **<Alt>-096** (a grave accent), **<Alt>-0168** (an umlaut or dieresis), **<Alt>-0145** (an open single quote), **<Alt>-0146** (a close single quote), **<Alt>-0172** (a hooked dash), **<Alt>-0183** (a dot).

For your final grouping, don't add a special character to the Shortcut name; Windows will put these Shortcuts at the bottom of the menu. For an example of the result, see **FIGURE 1**.

3. Most application menus (and the right-click menu) use divider lines to separate groups of commands. To get similar divider lines, first create a dummy Shortcut for each line: Right-click and drag any old readme or other file into the SendTo folder and choose *Create Shortcut(s) Here*. Then right-click each dummy Shortcut, select Rename from the pop-up menu, and enter about a dozen underscore characters to create the divider line. Use the technique in Tip 2 to get the lines to appear in the proper order between groups of Shortcuts.

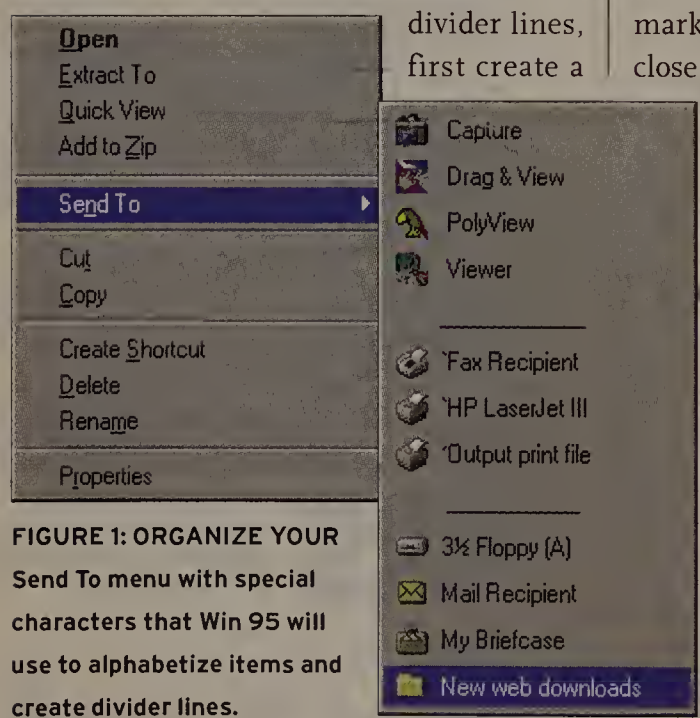


FIGURE 1: ORGANIZE YOUR Send To menu with special characters that Win 95 will use to alphabetize items and create divider lines.

For the best effect, assign a custom blank icon to these dummy Shortcuts. Windows doesn't come with blank icons, so you'll need an icon editor, which you can easily find at shareware sites on the World Wide Web.

If you have the Microsoft Internet Explorer, you'll find a blank mini-icon (the kind that appears in menus) in the iexplorer.exe file. To change the icon, right-click a dummy Shortcut, and choose *Properties*. Click the *Shortcut* tab, and click *Change Icon*. Type the path to your custom icon, and click *OK*. With Internet Explorer, type the path to iexplorer.exe, or click *Browse* and locate and select iexplorer.exe and click *OK*. Select the seventh icon (a document with a magnifying glass) or the eighth (a document with a question mark), and click *OK*. Click *OK* again to close the Shortcut's properties sheet.

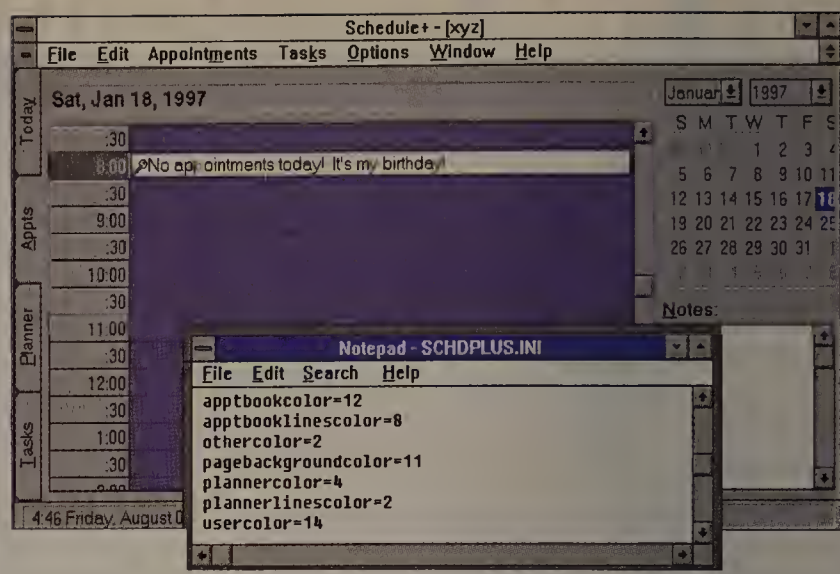


FIGURE 2: YOU CAN ADD MORE COLOR to Schedule+ for Windows for Workgroups 3.11 by editing the schdplus.ini file.

WASH AWAY THE GRAY IN SCHEDULE+

THE VERSION of Schedule+ that is included with Windows for Workgroups 3.11 has a default color scheme that may look like your laundry—shades of gray and pastel yellow. You can replace that palette with one of your own making.

Start Schedule+ and choose *Options•Display*. Using the drop-down lists, select colors for the Appointment Book and Planner backgrounds plus the Page background (the area surrounding the active tab). You can set a custom color to designate yourself and others in the Planner grid. When you're done, click *OK*.

Still not satisfied? By editing the schdplus.ini file in your Windows directory, you can also customize the color of the horizontal lines in the Appointment Book and the grid lines in the Planner.

In File Manager or Program Manager, choose *File•Run*, type **schdplus.ini** and then press **<Enter>** to open this settings file in a text editor. Under the [Microsoft Schedule+] heading, but above the next bracketed heading, add one line that reads **ApptBookLinesColor=1** and another that reads **PlannerLinesColor=1** (note that capitalization is not important). Change the 1 in each of the lines to any number from 1 to 17, as in **FIGURE 2**. These numbers correspond, in order, to the hues in the drop-down lists in the Display dialog box.

To make the grid and horizontal lines invisible (or nearly so), choose a number that corresponds to that window's background color. Then save the file. You don't need to restart Schedule+ to see your changes take effect; just choose *Options•Display* and press **<Enter>**.

START APPLICATIONS AS MINIMIZED ICONS

SOMETIMES YOU don't want to use a program the minute you start it. If you have several programs you plan to use soon, it might be more efficient to start them all at once.

The easiest way to do this is to have the applications start as minimized icons on the desktop (Windows 3.*x*) or the Taskbar (Win 95). Then you can switch to each application when you're ready.

Here's how to make an application start minimized—this is particularly useful for some applications in your StartUp group. Locate the Shortcut or Program Manager icon for the application. To set its properties, press **<Alt>** as you double-click it. In Windows 3.*x*, check *Run Minimized* and click *OK*. In Windows 95, click the *Shortcut* tab and choose *Minimized* from the *Run* drop-down list. Then click *OK*.

If you want an icon to behave this way only on demand, do this instead: In Windows 3.*x*, press **<Shift>** as you double-click an icon in Program Manager. You can do the same thing to an .exe file in File Manager, but you're better off selecting the file name before you <Shift>-double-click it to avoid selecting multiple files.

This feature doesn't work exactly the same in Windows 95; if you <Shift>-double-click a Shortcut or an .exe file in Explorer, the application won't start minimized, but it will start without putting its window in front of the Explorer window. This allows you to stay in Explorer and <Shift>-double-click one icon after another to start multiple applications in quick succession. But this trick doesn't work with every program.

WINDOWS NT BOOTING TIPS

WHEN you install Windows NT, it politely gives you the option of choosing between it and the previous operating system on your PC. Every time you start your computer, a boot menu lets you choose which operating system to use; if you don't press any key, Windows NT starts after 30 seconds.

But what if you don't want the system to default to NT? Or what if you don't want to wait 30 seconds for the NT default to start? Fortunately, you can customize attributes of the NT boot menu.

Here's what to do: Start up Windows NT and double-click the *Control Panel* icon in Program Manager. In Control Panel, double-click the *System* icon. From the *Startup* drop-down list, choose the operating system you want to use as the default. In the 'Show list for' area, type the number of seconds you want the boot options to appear before your computer runs the OS you set as the default. Then click *OK*.

Still not good enough? You can edit the boot.ini file in your root directory to customize the wording of the options. In File Manager, choose *View•By File Type*, check *Show Hidden/System Files*, and click *OK*. Select the boot.ini file and press **<Alt>-<Enter>** to display its properties. Uncheck *Read Only*, *Hidden*, and *System*, and click *OK*. Double-click *boot.ini* to open it in an editor. Under [operating systems] you should see one line for each of the boot options you get when you start your computer; the text that appears on screen is to the right of the equal sign (=) in quotation marks. Just edit the text between the quotation marks to customize the prompt—for example, 'Joe's Wonderful World of Widgets'. Don't change the material to the left of the equal sign.

To change the order of items in the boot menu, rearrange the lines under [operating systems] to conform to the order you want. Save the file and exit your text editor. The next time you reboot, you'll see your custom option names in the order you specified.

Find files from this article and additional tips at http://www.pcworld.com/hereshow.html. Windows Tips *welcomes your tips and questions and pays $50 for published items. Contributing editor Scott Dunn is a principal author of the* PC Bible, *2nd Edition (Peachpit Press, 1995, 800/283-9444).* *See page 12 for contact information.*

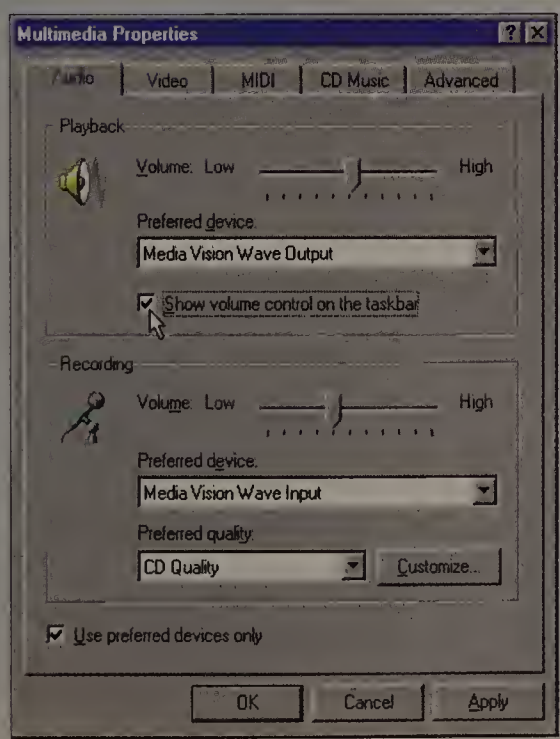
SEE THE SOUND

MY WIFE AND I use custom desktops when running Windows 95 on the same machine. Her desktop shows the speaker icon at the right end of the Taskbar, but mine does not. How can I display the speaker icon on my Taskbar?

Bob Taylor, Internet

CLICKING THE speaker icon to change your system's volume is a handy way to pump up or tone down Windows sound on the fly.

To get this feature, choose *Start•Settings•Control Panel*. Double-click the *Multimedia* icon, and make sure the *Audio* tab is selected. Check the *Show volume control on the taskbar* check box, as in the figure at left, and click *OK*. The speaker icon will appear on the Taskbar immediately.



CLICK TO CONTROL VOLUME after you check that option in the Multimedia Properties sheet.

TO DESTROY OR MSCREATE

AFTER INSTALLING a Microsoft Windows 95 program, there always seem to be a lot of copies of the file mscreate.dir scattered throughout its folders. Are these just temporary setup files that I can delete?

Tyler Bittner, America Online

THESE FILES ARE CREATED by the setup program of a number of Windows 95 applications as a way of keeping track of which folders were created by Setup and which weren't.

If you later run Setup to add or remove parts or all of an application, Setup uses the presence of mscreate.dir to decide whether it's safe to delete an empty folder. If Setup can't find mscreate.dir in a folder it created, Setup won't delete the folder even though it may be empty.

So what should you do? Deleting these normally hidden files won't buy you much disk space—they're zero-byte files, after all. And it will end up handing you the chore of deleting empty, unused folders after you remove software from your system. In this case, you're better off leaving well enough alone.

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Get centered ◆ Re-enter standard text via abbreviations ◆ Slow screen scroll

Centering Text Vertically in Any Word Processor

OKAY, YOU'VE WRITTEN a great letter—but it's just a few paragraphs and looks really ugly on the page. You need to center it vertically to make it look good. You could hit <Enter> a few times, but there's a better way. All current word processors let you center text on a page before or after you create the document:

Word 6 and 7 Select *File•Page Setup*, then click the *Layout* tab. Click the *Vertical Alignment* drop-down list and choose *Center*. Click *OK* to finish the job.

WordPerfect 6.1 and 7 Select *Format•Page•Center*. In the *Center Page(s)* dialog box, choose one of the available options (*Current page* works for one-page documents), then click *OK*.

Word Pro 96 Use the Page Properties InfoBox to center pages vertically. Right-click the page, then select *Page Properties* from the pop-up menu. Click the *Misc* tab in the InfoBox, then click the center button in the Vertical Alignment group of buttons, as in **FIGURE 1**.

AUTOMATE REPETITIVE TYPING

HOW MANY TIMES a day do you type your name, the name of your company, or some other standard text? Most of us just repeat the work again and again without thinking. Today's word processors can enter oft-used text automatically whenever you type an abbreviation. This feature is built into the programs, but few users take advantage of it. Here's how to set it up in your favorite word processor:

Word 6 and 7 Type the recurring phrase into a blank document and highlight it, or highlight any block of text in an existing document. Select *Tools•AutoCorrect*. The selected phrase will appear in the 'With' box of the AutoCorrect dialog box, and the cursor will be in the 'Replace' box. In the 'Replace' box, type an abbreviation for your text, making sure it's not a word you might type for another purpose, then click *Add* and *OK*. That's it. From then on just type the abbreviation, press **<Space>**, and Word will insert the entire phrase.

WordPerfect 6.1 and 7 Type your phrase into a blank document and highlight it, or highlight the phrase in existing text. Select *Tools•QuickCorrect*. The selected text will appear in the 'With' box of the QuickCorrect dialog box. Type an abbreviation in the 'Replace' box, then select *Add Entry* and *Close* to store it. To insert the phrase, type the abbreviation, then press **<Enter>**.

Word Pro 96 In this program you have to enter the text in a dialog box instead of highlighting it in the document. Select *Edit•SmartCorrect*. In the SmartCorrect dialog box, click the *Add Entry* button, and in the resulting dialog box, type your abbreviation in the 'SmartCorrect entry' box. Press **<Tab>**, then type the complete phrase into the 'Replacement text' box. Click *OK* twice to finish. To insert the phrase later in your documents, type the abbreviation, then press **<Space>**.

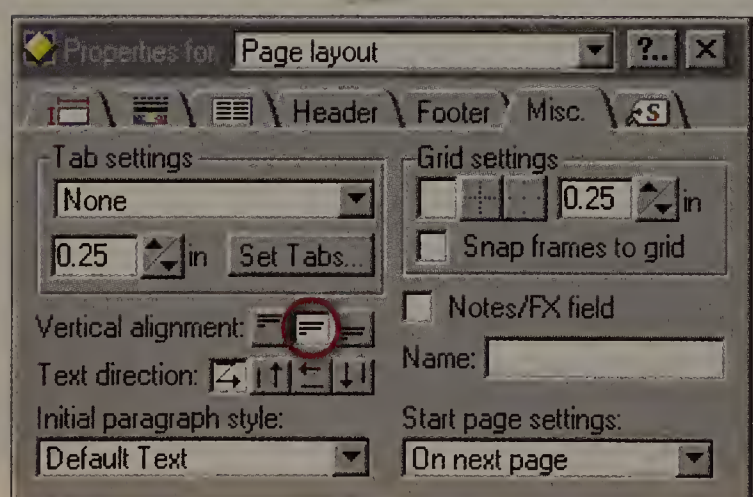
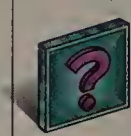


FIGURE 1: VERTICALLY CENTER A PAGE in WordPro 96 by using the Page Layout InfoBox (see circled button).

DRAG-FREE TEXT SELECTION IN ALL WORD PROCESSORS



WHENEVER I TRY to click and drag to select a large block of text that extends past the bottom of the screen, Word 7 scrolls so fast that I end up selecting far more text than I want. Is there a less frustrating way to do large selections?

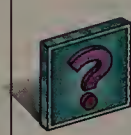
Mario Cormier, Internet

I GET A LOT of questions about this. In Word 6 and 7, you can slow scrolling a bit by dragging the mouse just below the document window, rather than further down the screen. That trick doesn't help on fast Pentium machines, though; Word still scrolls too fast for comfort.

Fortunately, there's a much better way to handle selecting large blocks of text; the technique works in every word processor because it's a basic Windows function.

Click where you want the text selection to begin. Use the scroll bar instead of the cursor keys to move down in the document until you can see the end of the desired selection. Hold down the **<Shift>** key, then click at the end of the text you want to highlight. That's all you have to do: You won't be blinded by Word's scrolling speed again.

STORING NEW STYLES IN WORDPERFECT 6.1 AND 7

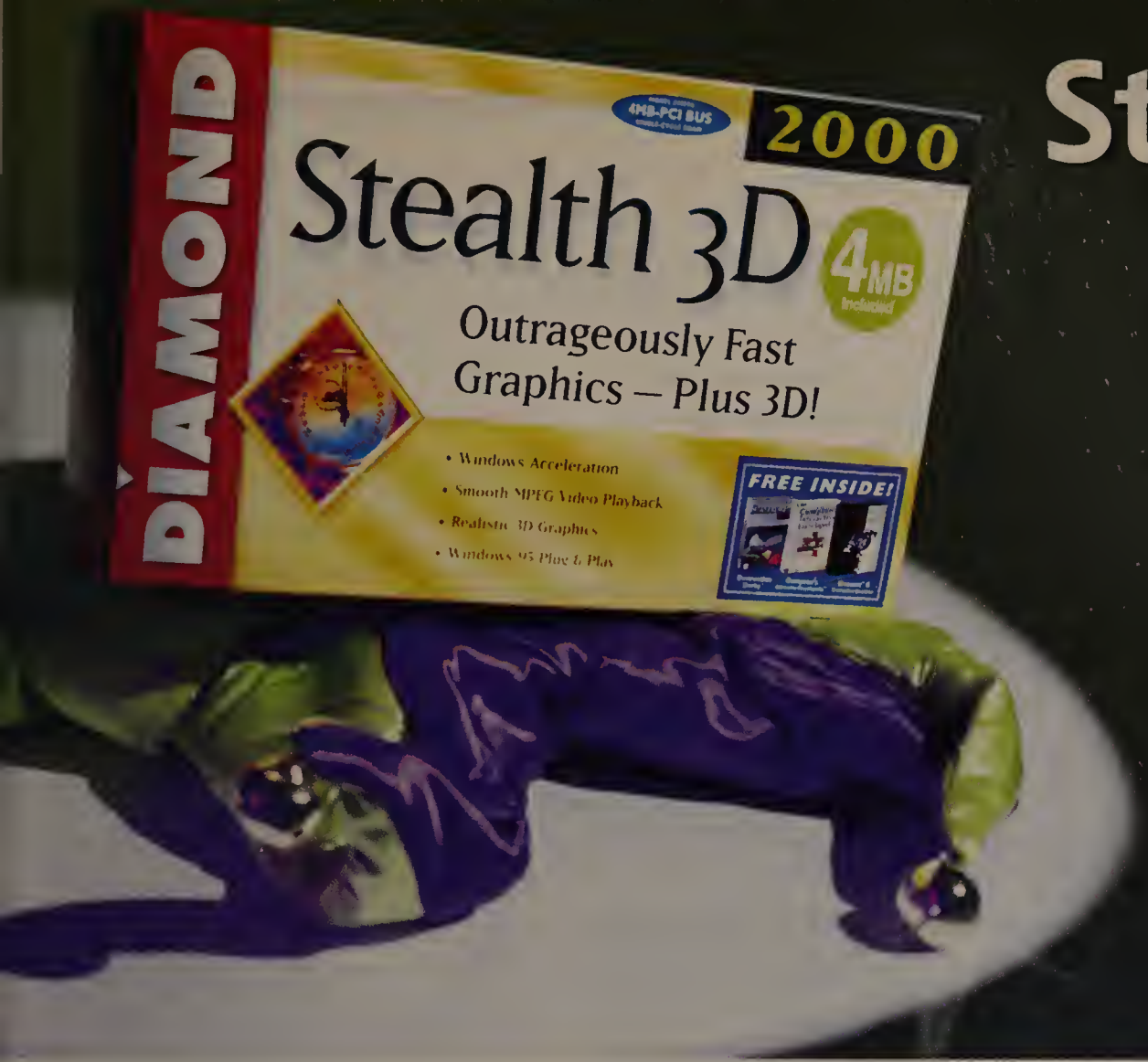


I OFTEN CREATE new styles in WordPerfect 7 while I'm working on a document. I expect a newly created style to be available to me in other documents, but it doesn't show up in the Style List dialog box. What am I doing wrong?

Alice Baxter, Boston

BY DEFAULT, WordPerfect 6.1 and 7 store all styles that you create in the current document. Storing a style in a template so that you can use it in other documents takes an extra step.

Here's what you have to do. Create your new styles as you do now—by selecting *Format•Styles*, clicking the *Create* button or the *QuickStyle* button in the Style List dialog box, and then filling in the Styles Editor dialog box. Back in the Style List dialog box, click the *Options* button and select *Copy* from the drop-down ▶



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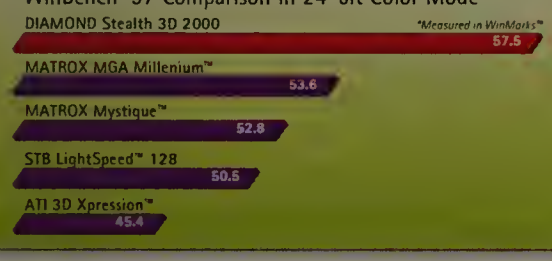

3D Hardware Features Comparison

	Stealth 3D	MATROX Millennium
Gouraud Shading	◆	◆
Perspective Correction	◆	
Alpha Blending	◆	
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Bilinear Filtering	◆	
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PC MAGAZINE EDITORS' CHOICE

December 3, 1996

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menu. Select *Template* in the Styles Copy dialog box, then click *OK* and *Close*.

If you are going to create multiple styles, though, select *Options•Setup* in the Style List dialog box before creating the first style. Select *Default Template* in the 'Default location' frame of the Style Setup dialog box, then click *OK*.

Once you do this, all styles that you create during that session will automatically end up in the template. Unfortunately, you will find that this default setting is lost whenever you exit WordPerfect.

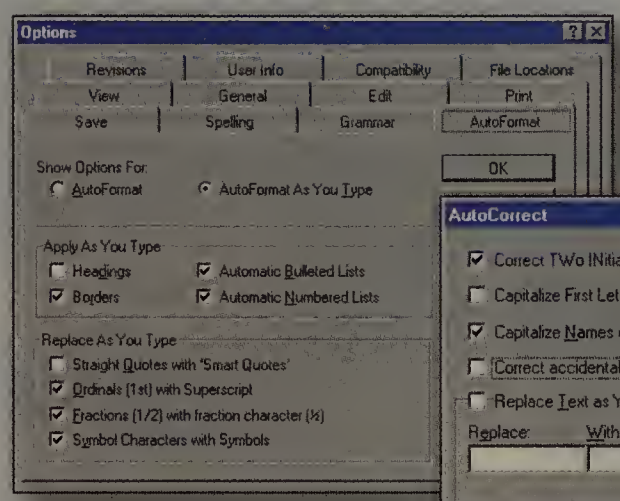
Word Processing *welcomes your tips and questions and pays $50 for published items. See page 12 for contact information. George Campbell is a* PC World *contributing editor and was a collaborator on* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* ■

STEP BY STEP

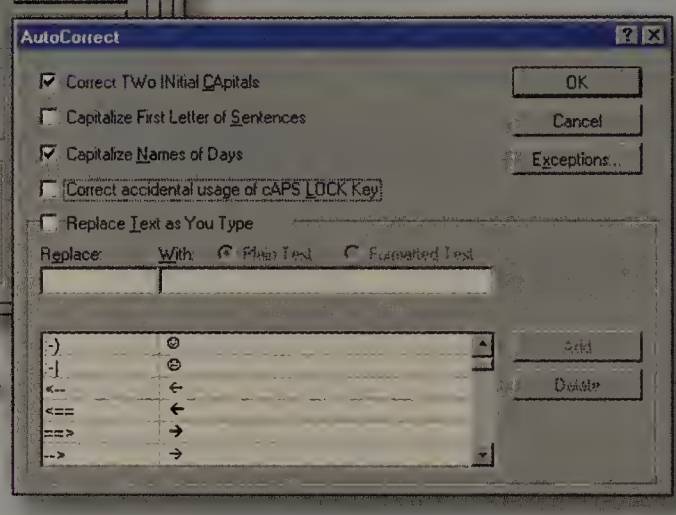
Take Your Word Processor Off Autopilot So It Will Do Only What You Want

THE CURRENT CROP of word processors can do a lot of work for you, creating bulleted lists automatically, correcting common misspellings, inserting special characters, and so on. But you may want to turn these features off for some projects, or perhaps they just don't suit your style. Here's how to shut down all or part of this automation in the three major word processors.

Word 6 and 7



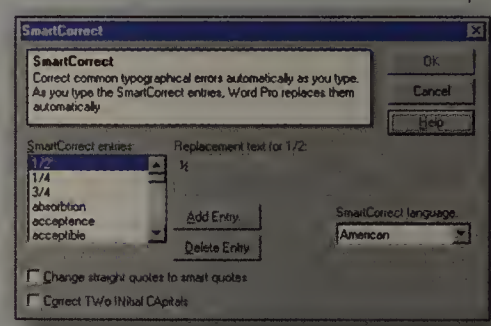
To control Word's AutoFormat functions, select *Tools•Options*, then click the *AutoFormat* tab. In Word 7, you then select *AutoFormat As You Type*. In both releases, select the features you want to enable or disable, then click *OK*.



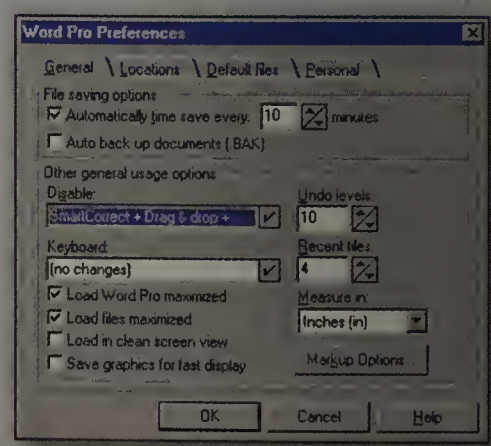
To control Word's AutoCorrect functions, select *Tools•AutoCorrect*, select the features you want to enable or disable, then click *OK*.

Word Pro 96

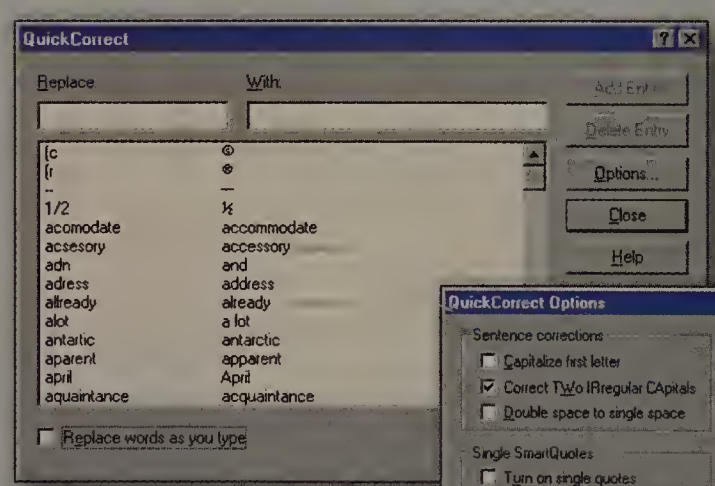
To control Word Pro's automatic correction of spelling and punctuation errors and the use of true quotation marks, select *Edit•SmartCorrect*. In the SmartCorrect dialog box, select the features you want to enable or disable, then click *OK*.



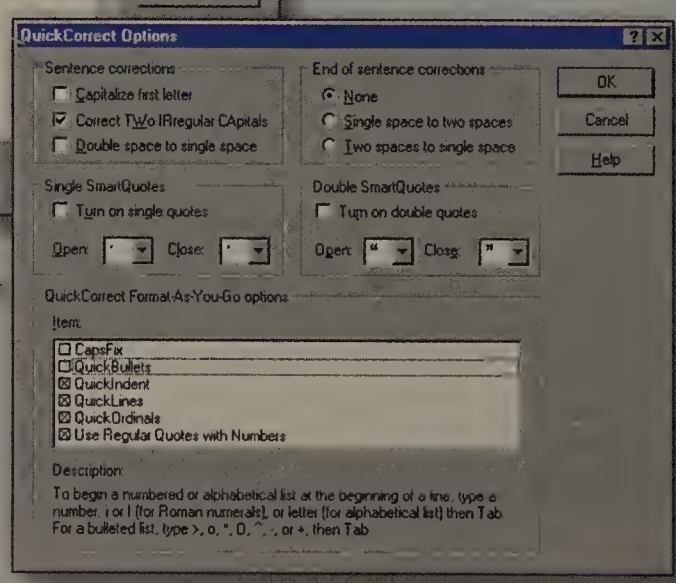
To disable SmartCorrect altogether, select *File•User Setup•Word Pro Preferences*. In the resulting dialog box, make sure the *General* tab is selected, click the Disable drop-down list and click *SmartCorrect*. (If it is checked, it is disabled.) Click *OK*.



WordPerfect 6.1 and 7



To control WordPerfect's automatic spelling corrections, select *Tools•QuickCorrect*. In the QuickCorrect dialog box, select the *Replace Words as You Type* check box to enable or disable this feature.



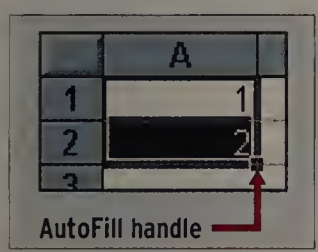
To control WordPerfect features such as true quotation marks and automatic bulleted and numbered lists, click the *Options* button in the QuickCorrect dialog box. In the resulting dialog box, select the features you want to enable or disable, then click *OK* and *Close*.

Bingo! Random Numbers

I'VE RECEIVED MANY inquiries lately about generating random numbers, but I held off answering until Nilo Bonsol of Torrance, California, e-mailed asking how to generate bingo cards with Excel. How could I resist? A bingo card incorporates 24 random numbers between 1 and 100, with no repetitions.

The procedure I describe here, which works with minor modifications in any spreadsheet, shows a basic approach to generating such sets, and for referencing them in worksheet layouts.

Starting with an empty workbook, select *Insert•Worksheet* to create two pages. Then double-click the first sheet tab, and enter the name **RandomList**; name the second sheet **BingoCard**. Select the sheet *RandomList*, enter **1** in cell A1, and **2** in cell A2. Select A1:A2, and drag the AutoFill handle (see figure above) to cell A100.



You now have an ordered set of 100 integers. In cell B1, enter the formula **=rand()**, and use the same AutoFill trick to copy it to B2:B100. At this point, you can randomize your list of integers: Select a cell in column B, and click the *Sort Ascending* button on the Standard toolbar a few times.

Now for the card. Select the *BingoCard* sheet and enter the labels and numbers shown in B1:F2 and in A3:A7 of the next figure. In cell B3, enter the formula **=INDEX(RandomList!$A$1:$A$100,B$1+$A3)**, and copy it to B3:F7. This formula uses the numbers in row 1 and column A to create a series of index values that take the first 25 numbers from the list on the RandomList sheet. Select cell D5 and make sure your keyboard's NumLock is off. Press and hold **<Alt>** and type **0182** on the keypad. Release **<Alt>** and press **<Enter>**. You'll probably see a paragraph symbol; in the following steps, we'll reformat the cell so it displays a star.

Okay, let's dress up the bingo card. Select B2:F2, select *Format•Cells*, click the *Font* tab in the Format Cells dialog box, and select a large, fancy font (I chose the 36-point Footlight MT Light font). Click the *Patterns* tab in the same dialog box, select a light gray shade, and then click *OK*.

	B	I	N	G	O
0	92	47	86	62	94
5	73	61	66	2	43
10	80	29	☆	99	42
15	36	27	14	3	28
20	79	87	39	63	18

Select B3:F7, select *Format•Cells*, click the *Font* tab, and select the 24-point Arial font to match the figure. To get the star in the middle of the bingo card, click cell D5, select *Format•Cells*, click the *Font* tab, and select the *Wingdings* font. Click the *Patterns* tab, and select a gray cell shade.

Select B2:F7, select *Format•Cells*, click the *Alignment* tab, and select *Center* for both the horizontal and vertical dimensions. Click the *Border* tab, click the third line in the Style section, then click *Left*, *Right*, *Top*, and *Bottom*, and click *OK*.

Finally, select *File•Page Setup*, click the *Margins* tab, and select *Horizontally* in the Center on Page section. Now click the *Sheet* tab in the same dialog box, type **B2:F7** in the Print Area box, and click *OK*.

To print your bingo cards, select the *RandomList* sheet, select a cell in column B, and click the *Sort Ascending* button. Then select the *BingoCard* sheet and check the numbers. If you see the characters '##' in one or more of the cells, go back to the *RandomList* sheet and click the *Sort Ascending* button again. When everything is okay, select *File•Print*. When it's time for a game, simply re-sort the list of random numbers and call out the ones that come to the surface.

CALCULATING JULIAN DATES, REDUX

Several readers have pointed out that there's a simpler way to calculate a date's number within each year (where January 1 is day 1, September 1 is either day 244 or day 245, depending upon whether it's a leap year, and so on).

Instead of the complex formula I suggested in the September column, try this one, where the date you want to work with is in cell A1:

+a1-date(year(a1)-1,12,31)

Spreadsheet Tips *welcomes your tips and questions and pays $50 for published items. See page 12 for contact information. Richard Scoville is* PC World *contributing editor and a software training consultant based in Chapel Hill, North Carolina.* ■

SPREADSHEETS TOOLBOX

Excelling on the World Wide Web

IF YOU'RE LOOKING for an Excel model but lack the time or inclination to put it together yourself, or if you just want to learn more about developing your own models, check out Baarns Publishing's Web site (http://www.baarns.com). Don Baarns, along with Eric Wells and Dan Williams of Microsoft, has done much to foster Excel as a serious development platform. Baarns' Web site features a host of models, some created by Baarns and his team, some by third-party vendors. A few are free, and most are under $50.

Some notable tools are Baarns' Statistical Process Control Charts ($29.95), a job cost estimator ($19.95), and a mortgage analysis package ($29.95). Once you have opened a file, select *Format•Sheet•Unhide* to make the macros and dialog boxes visible.

•Baarns Publishing 800/377-9235, 818/837-1441 818/837-1445 (fax); http://www.baarns.com

Create Push-Button Menus

IT'S EASY TO CREATE a database menu form with push-button controls. You can start from scratch or copy a menu from a sample database and customize it. I often start with a blank form, change it a bit, then pirate some buttons from another menu. Next, I change the code attached to the buttons and call the form Menu—unimaginative but easy to identify.

These steps apply to Access. For other databases, visit PC World Online at http://www.pcworld.com/hereshow.html.

1. Create a new blank form: In the database window, select the *Forms* tab, then click the *New* button. In the New Form dialog box, leave *Design View* highlighted and click *OK*. You don't need to choose a table or a query for the form.

2. The grid area that appears represents the background of your menu. To resize the grid area, click and drag its lower right corner (see **STEP BY STEP**, below).

3. Change some of the form properties to make the form look more like a dialog box and less like a window for viewing records. Right-click the box to the left of the horizontal ruler, choose *Properties*, and select the *Format* tab. Set Scroll Bars to *Neither*, Record Selectors to *No*, and Navigation Buttons to *No*, as in the figure.

4. To change the background color of the form, leave the Properties box open and click the *Detail* bar on the form. Make sure the *Format* tab is selected, and click the *Back Color* line. Click the ... button that appears at the end of the line to open the Color dialog box. Select a shade, then click *OK*. Click the *Detail* bar again to see how your choice looks.

5. Before you start adding push buttons, click the *Label* tool in the toolbox, drag the mouse to create a box for the title, then enter a title in the box. If you decide that using an appropriate file name for the form is enough, select *File•Save* and enter a name like **Menu**.

You can add a graphic to a menu form. Click the *Image* button in the toolbox, drag the mouse to create a box for the image, then select a graphic from the Insert Picture dialog box. Depending on how your software was installed, you may find interesting pictures in the c:\msoffice\clipart directory or in c:\msoffice\access\bitmaps\dbwiz.

6. Click the *Command* button in the toolbox, and drag the mouse to create a push button on the form. If the Control Wizard button is depressed, you'll get help from the Command Button Wizard, which offers lots of options: actions for opening forms and reports, moving through records, and other common tasks. You can also show a text label or a picture on the button.

7. To copy a button you've already placed on the form, click the button and select *Edit•Duplicate*. Double-click the text on the new button to edit it or change its Caption property. If you copy a button, change its On Click property: In the Command Button dialog box, select the *Event* tab, click the ... button at the end of the line, and select *Macro Builder* in the Choose Builder dialog box. (It may be quicker to use the Command Button Wizard again.)

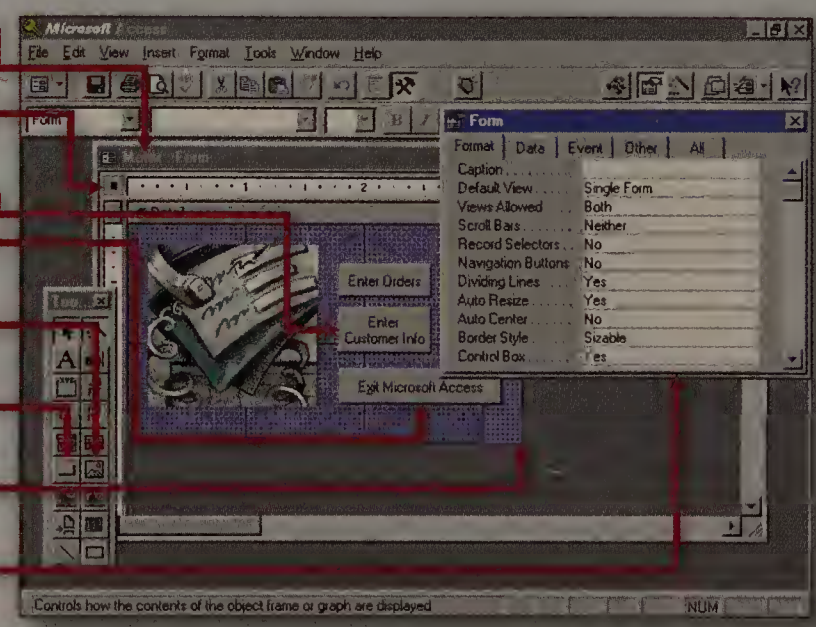
You can also copy macro buttons from one form to another. Both databases must include the macro that's attached to the command button being copied. Open the form that contains the button you want to copy, go into Design mode, select the button, and click the *Copy* button on the main toolbar. Go back to your menu form in Design mode, click the *Paste* button, then drag the copied button to wherever you want it. This trick works when you don't need to change the action that belongs to the Command button.

8. Select *File•Save*; name the form **Menu**.

9. To open the menu form automatically when you open the database, choose *Tools•Startup*, click the *Display Form* drop-down box, select *Menu*, and click *OK*. You can also use an autoexec macro to open the form.

STEP BY STEP

Add a Push-Button Menu to an Access Database



Find files from this article and additional tips at http://www.pcworld.com/hereshow.html. Database Tips *welcomes your tips and questions and pays $50 for published items. See page 12 for contact information. Contributing Editor Celeste Robinson is the coauthor of* Mastering Paradox 7 for Windows 95 *(Sybex, 1996, 800/227-2346).* ■

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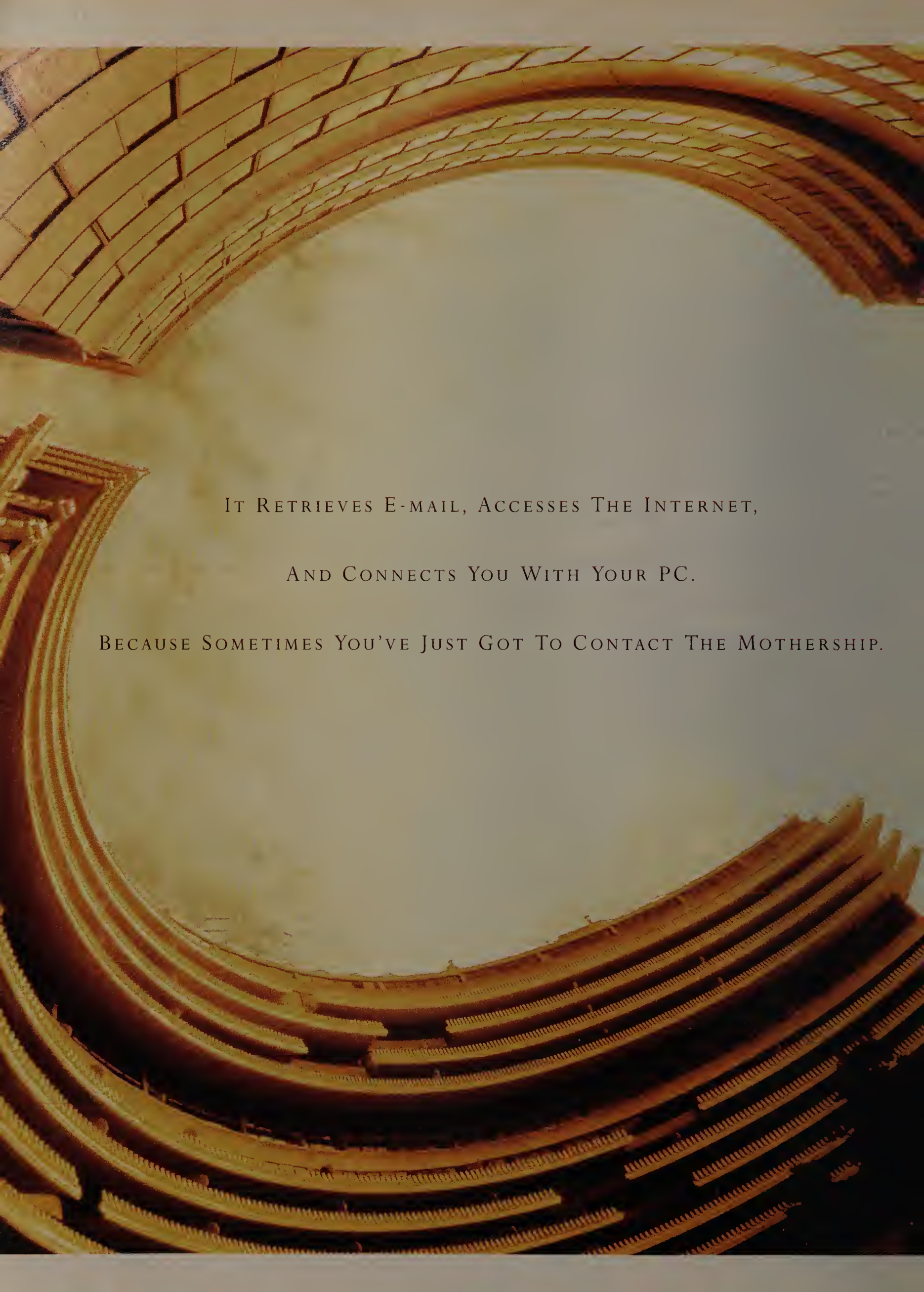
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More accessible Web pages ◆ Are cookies good for you? ◆ Find doctors online

Beware of E-Mail Forgery

LAST SUMMER the editor of a computer magazine in Boston received a barrage of nasty e-mail messages, seemingly from me and other magazine editors. After a flurry of alarmed phone calls between network mail administrators at the magazines concerned, we traced the messages to an unknown hacker from an address in Buenos Aires. The hacker had broken into the mail servers of various magazines and sent forged e-mail messages to editors at other magazines.

Since journalists are often insulted by other journalists, most recipients of these forgeries only shrugged wearily.

The phenomenon is called "e-mail spoofing," and most e-mail systems are vulnerable to it. Even a mail server nestled behind a firewall can fall victim to a prankster who sends employees forged mail that looks like it came from other employees or companies.

The problem is most prevalent in secondary schools. Youngsters soon learn that they can use their new Internet connection to send e-mail to other students—and make it look like it was written by a teacher or the principal.

In an education mailing list, a junior high school administrator described how a student used his parents' America Online account to send harassing e-mail to a former teacher. By shipping it out on the Internet and redirecting it, this resourceful teen made it appear as if the mail originated from inside his school.

Is there any way to protect your mail server from pranksters? Unfortunately, no, because of weaknesses in the SMTP mail protocol. Until technology catches up to the wiles of sociopaths, you'll just have to discount as juvenile pranks all messages that don't make sense.

Especially if they're from me.

Make Your Web Page Friendlier for Sight-Impaired Readers

Here are tips to make sites accessible to sight-impaired viewers:

1. Offer text-only versions of your pages. Place the hot link to the text version at the very top of the page so surfers with screen readers don't have to listen to the entire page in order to find it.

2. Skip the magenta fish-scale background with white letters. Aim for high contrast between text and background. White lettering on black is best for low-vision computer users. Use big, bold letters.

3. Avoid tables if you can. If you can't, provide a link to a text version of the table.

4. Include a description of each picture, or a link to a page describing the picture.

5. If you use an image map, provide a link to a page offering the map's links in text form.

6. Download NCAM's Web access symbol, shown here, from the NCAM site (http://www.boston.com/wgbh/pages/ncam/symbolwinner.html) and add it to your page.

WEB PAGES FOR THE DISABLED

FOR THE SIGHT-IMPAIRED, surfing the World Wide Web can be like stumbling through a dark art gallery: You can't distinguish the pictures from the doors. Your screen reader can't tell you what's in a picture. Image maps hold no information for you. You can't correctly "hear" what's in a table, because your screen reader jumbles its content into one long sentence.

Numerous efforts are under way to make the Web more accessible to visually impaired users. They range from defining HTML standards for tagging graphics with a good spoken description, to encouraging Web page owners to offer text-only versions of their pages.

The Web site of WGBH, a public television station serving the Boston area (http://www.boston.com/wgbh/pages/access/accessinstructions.html), offers a continuing experiment in accessibility solutions for both blind and hearing-impaired users. For those with limited vision, for example, a giant letter *D* precedes images on the WGBH site (see the figure below). Clicking on the *D* displays a two- to three-sentence description that can be heard through a screen reader.

Making your own Web site (business or personal) accessible to users with disabilities doesn't require a lot of work (see "Make Your Web Page Friendlier for Sight-Impaired Readers").

Offering a text-only version of your page is a good start. You'll find a complete guide on how to make a Web site more easily accessible at the Web site of the Trace R&D Center at the University of Wisconsin, Madison (http://www.trace.wisc.edu/world/web/index.html).

You might also check out the page for the National Center for Accessible Media (http://www.boston.com/wgbh/pages/ncam/captionedmovies.html), shown in **FIGURE 1**, and the page for the Center for Information Technology Accommodation (http://www.gsa.gov:80/coca/).

As one blind Web surfer notes, "The number of solutions is proliferating. The great thing about the Web is that it offers something for everyone."

HAVE A COOKIE

I'M RUNNING Netscape Gold 3. When I choose Options•Network preferences/Protocols, it says 'Show an alert before accepting a cookie'. I placed a check mark in the box, and now, when- ▶

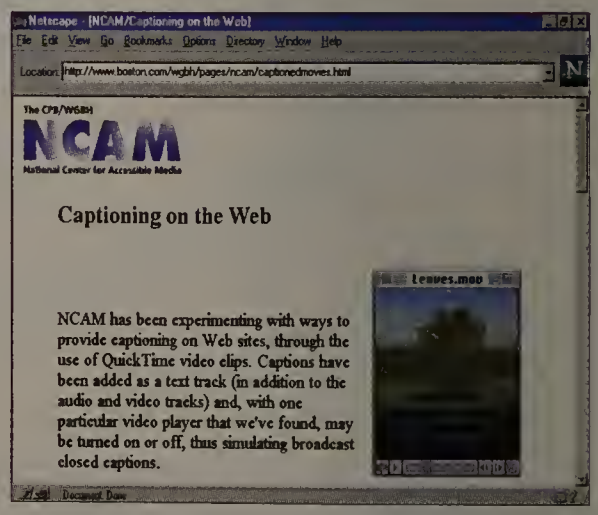


FIGURE 1: CAPTIONS FOR QUICKTIME MOVIES can be added as text tracks. The National Center for Accessible Media is exploring such options.

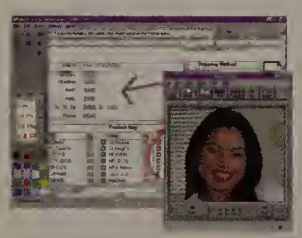
See what you've been missing on the Internet.

You've got Internet e-mail, Internet chat sessions and even Internet telephone calls. But if you're not communicating with live video and audio over the Internet – you're missing the picture.

AudioVision 2.0 is the amazing software that lets you communicate with live two-way audio and video over the Internet and by direct telephone connection. And AudioVision is fast, with transmission rates up to 15 frames a second over ordinary telephone lines.

With AudioVision, you can send VMail™, video e-mail that any Windows user can view – without additional hardware. And since it takes two to communicate, AudioVision includes two copies, plus a copy of AudioVision/324, the special edition of AudioVision that lets you connect with standard H.324 video phones worldwide.

AudioVision supports virtually all major digital cameras and most capture boards and it's a breeze to install and use. So stop missing the picture, pick up AudioVision or download a free demo version at www.smithmicro.com



call the plant in asia over the Internet and discuss scheduling using the whiteboard

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ever I log on to PC World Online, I get this message: 'The server www.pcworld.com wishes to get a cookie that will be sent to any server in the domain pcworld'. What is a cookie? What are you sending me and what will it do to my PC?

Don A. Dudley, Fond du Lac, Wisconsin

DON'T WORRY ABOUT IT, DON. We're only collecting data to use in scientific experiments. I can't tell you what the experiments are, only that we will know shortly what sorts of things drive our readers to pull out their credit cards and send us huge amounts of cash.

Just joking. Actually, cookies are pretty harmless, and they can save you time on a Web site or offer customized service. A cookie is merely some encoded data that a Web site sends your browser for retrieval later, when you progress to a different page in the site or when you next log on to the site. The cookie could be a number that identifies you from one visit to the next, or it may be information that you've typed into the Web site.

For instance, if you visit an online shopping site, you might select items to add to an "electronic shopping cart." When it comes time to place your order—either 25 Web pages later or during your next visit to the site—the Web site must send your browser a cookie identifying you and specifying the items you selected. In this case, your browser and the site may pass cookies back and forth many times during an online session.

Cookies have other uses as well. Cookies can generate profiles of a Web site's visitors—monitoring the pages and items people like to access—for marketing purposes or to tailor the site better to users' interests. At Yahoo's My Yahoo site (http://edit.my.yahoo.com/bin/login), cookies help create a personal version of Yahoo that includes your favorite Web sites and news topics. PC World Online (http://www.pcworld.com/) uses cookies to create its Interactive Top 20 feature, and in the future, cookies will help give readers personalized views of the site.

There's no risk from cookies: They can't contain viruses to infect your system, nor can they steal private data off your disk and send it to the originating Web site.

Not all browsers support cookies, but most soon will because corporate America wants them. Cookies are the only way a Web site can track users from one page to the next. They're also the only way to know how many surfers are accessing a site. Navigator keeps a list of the cookies it has collected in a file named cookies.txt in your Navigator directory (see **FIGURE 2**).

Many people think that cookies are a violation of privacy. You can tell your browser to warn you whenever a Web site tries to send you a cookie, then forbid it from doing so, as you have done. But when you log into sites that repeatedly attempt to send cookies, those pop-up alerts can get irritating.

One solution is Internet Fast Forward, a Navigator plug-in that stifles all cookie giveaway attempts. Fast Forward can also block out those annoying ads that scroll at the bottom of the screen, and graphics larger than a specific size. You can download the free beta version of Fast Forward from the PrivNet Web page (http://www.privnet.com/iff.html), or look on PC World Online for the file named iff095b2.exe. Prices of non-beta versions were not set at press time.

If you swear off cookies, be aware that your favorite Web sites may start to show certain forms of brain damage. For example, you may have to register every time you visit a page.

Where did the term *cookies* come from? Its source is the hacker phrase *magic cookies*, applied to programs with seemingly magical powers.

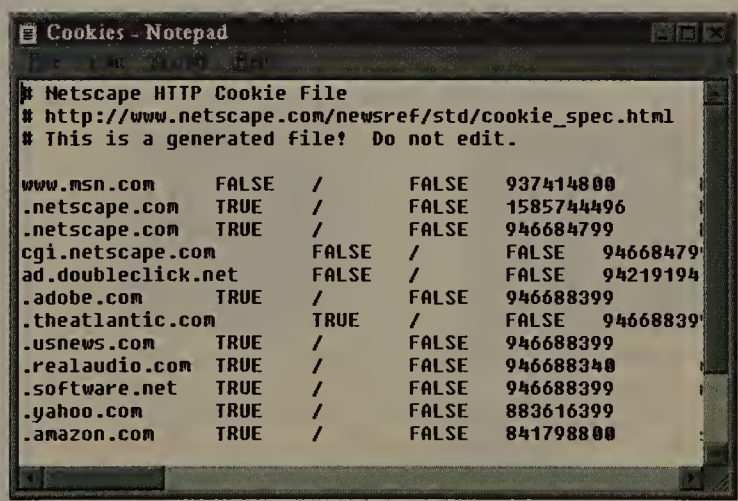
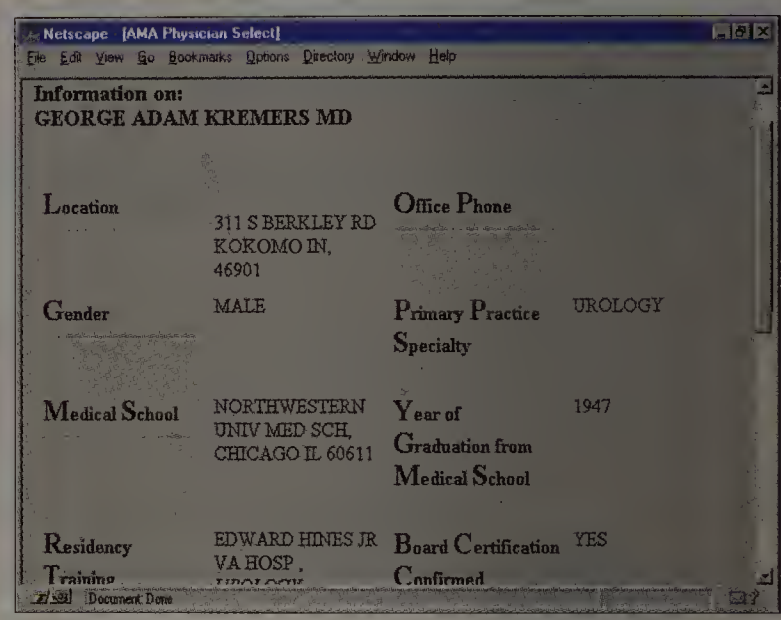


FIGURE 2: NETSCAPE'S COOKIE FILE lists the names of Web sites that have shipped you cookies (the leftmost column) and the names of the cookies (the rightmost column).

Find-a-Doc Online

Looking for an otolaryngologist in your state, or want to check your physician's credentials? Head to the American Medical Association's Web site (http://www.ama-assn.org/) and click the *AMA Physician Select* link.

You can search for doctors by specialty, name, and location. Physician Select will tell you where the doctors went to med school, where they did their residencies, and whether they're board-certified in their specialties. Don't look for malpractice suit filings or complaints to state medical boards, however. The AMA wants to keep such information offline.



Find files from this article and additional tips at http://www.pcworld.com/hereshow.html. Internet Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Judy Heim is the author of* Internet for Cats *(No Starch Press, 1995, 800/420-7240). See page 12 for contact information.* ■

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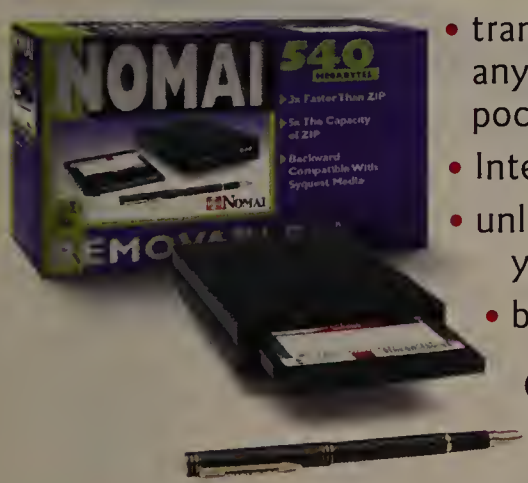

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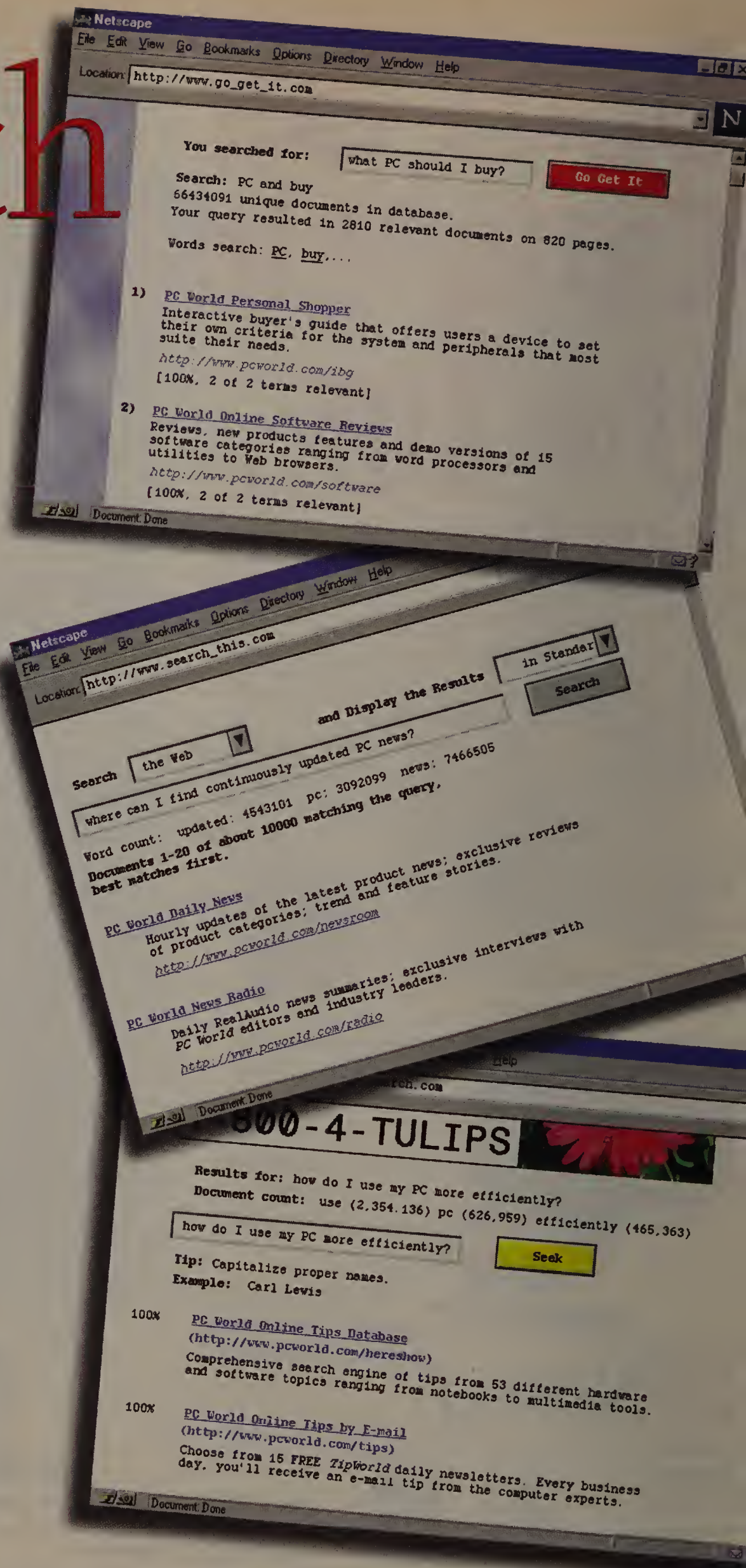

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Speed Up Dial-Up Modems

A LITTLE OVER A YEAR AGO, when the first crop of affordable V.34, 28.8-kbps analog modems hit the market, we were told that this technology squeezed every last bit of bandwidth out of the existing telephone infrastructure.

We were misinformed.

Two higher-performance features are showing up in affordable V.34 modems, thanks to new data-handling techniques: 33.6-kbps data rates and 230-kbps throughput. (Vendors are also talking about a third dial-up option said to offer rates up to 56 kbps in one direction, but at press time none had publicly shown such technology.)

The first of the options available today, 33.6-kbps rates, is not overwhelming. If you need another modem, by all means purchase one capable of 33.6 kbps; these cost little more than 28.8 models.

And if you already have a 28.8-kbps modem, check with your modem's manufacturer about upgrades. You can upgrade U.S. Robotics Courier modems to 33.6 kbps, for example, by downloading free software from the company Web site (http://www.usr.com/home/online/upgrades.htm). For most U.S. Robotics Sportster models, making the jump to 33.6 requires swapping a $25 ROM chip on the modem card.

But is it worth buying such a chip—or a whole new modem—just to gain 4.8 kbps? Probably not. You get, at most, a 17 percent increase in performance. And that assumes that you've got a similar modem on the other end and perfect line conditions for the transmission.

FREEDOM OF COMPRESSION

THE SECOND NEW FEATURE—230-kbps throughput through enhanced compression techniques—is a much better bet.

While we may identify modems by their modem-to-modem throughput (such as 14.4, 28.8, and so on), they can achieve much higher *effective* throughput as a result of compression.

When you transfer a file, your computer sends the file through a serial port (or, with internal modems, firmware that emulates a serial port) and into the modem, where it's compressed and then sent out. The efficiency of compression depends on the file type. Text and graphics files usually yield the best compression ratios, but precompressed files such as ZIP files can't be compacted much more.

The handling of highly compressible data is also limited by how fast the serial port can pump data to the modem.

Until recently, the fastest PC serial ports supported a maximum of 115 kbps, so 28.8 modems were limited to a maximum compression ratio of 4 to 1. But new enhanced serial ports that can handle rates of 230 kbps, combined with beefed-up compression hardware on the modem itself, have pushed that theoretical peak up to 8 to 1.

So if you're sending or receiving highly compressible data, you could conceivably double your throughput. In fact, our early performance tests of such modems appear to confirm this.

Does buying a new modem to obtain these higher rates worth it? If you send or receive lots of compressible files, yes.

WHEREFORE UART THOU

ONE CAUTION: THE KEY to an enhanced serial port is the UART chip, which controls the flow of data across the serial port. To support 230-kbps rates, the serial port should use at least a model 16650 UART; 16550 or earlier chips don't do the job.

External modems connect to a serial port that's controlled by a UART on the motherboard or on a serial card. To find out what type of chip your serial port uses, run PortInfo 4.0, a $20 utility from Computer Telecommunications Systems.

If you're stuck with a slow UART—and even most new motherboards currently use the 16550—consider buying a high-speed serial card like the ESP from Hayes Microcomputer Products or the TurboExpress from Pacific CommWare.

Internal modems put a UART right on the modem card or emulate it in firmware. So if you have an upgradable internal modem, you don't need to worry about the UART's limitations: The software or hardware boost will upgrade the UART functions as needed.

Finally, whatever modem you buy, make sure the manufacturer has software drivers for Windows 95, since the standard serial port driver may not be able to handle the higher rates.

• ESP $79.95 street; Hayes Microcomputer Products; 770/840-9200; http://www.hayes.com/

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• PortInfo 4.0 $20 shareware registration fee; Computer Telecommunications Systems, Inc.; 800/380-2666; http://www.comminfo.com

• TurboExpress $79.95 street; Pacific CommWare; 800/856-3818; http://www.turbocom.com/

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Pushing the Envelope for Dial-Up Connections

TECHNOLOGY	Pro	Con
33.6-kbps throughput	Up to 17 percent faster than previous 28.8-kbps standard.	Rarely achieved.
230-kbps effective throughput	Potential for dramatically greater throughput, especially with highly compressible files.	Maximum rarely achieved; requires very high-speed serial port.

ADVANCES IN ANALOG MODEM technology can boost dial-up access, but you'll rarely see these maximum speeds in the real world, and you'll need a similar modem on the other end.

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Talk *and* Listen on the Net

VENDORS OF INTERNET telephony products have come to a startling realization: Most people like to talk and listen at the same time. The technical term for this is full-duplex communication, and it's like talking on a phone. The alternative, half-duplex telephony, is like using a walkie-talkie or two-way radio: Each party must take turns speaking. For a recommended list of full-duplex sound cards, see Vocal-Tec's (makers of Internet Phone) Web site (http://www.vocaltec.com/fdxbr.htm).

If you've got a half-duplex board, you're probably out of luck. But there are some exceptions. Among these, Creative Labs' Sound Blaster 16 and Sound Blaster AWE32 are full-duplex cards that ship with half-duplex drivers. You can download the full-duplex drivers for the SB 16 and AWE32 boards from Creative Labs' FTP server (ftp://www.creaf.com/pub/creative/drivers/sb16awe/). For Windows 95, download sbw95up.exe; for Windows 3.*x*, get awedw3up.exe and s16dw3up.exe.

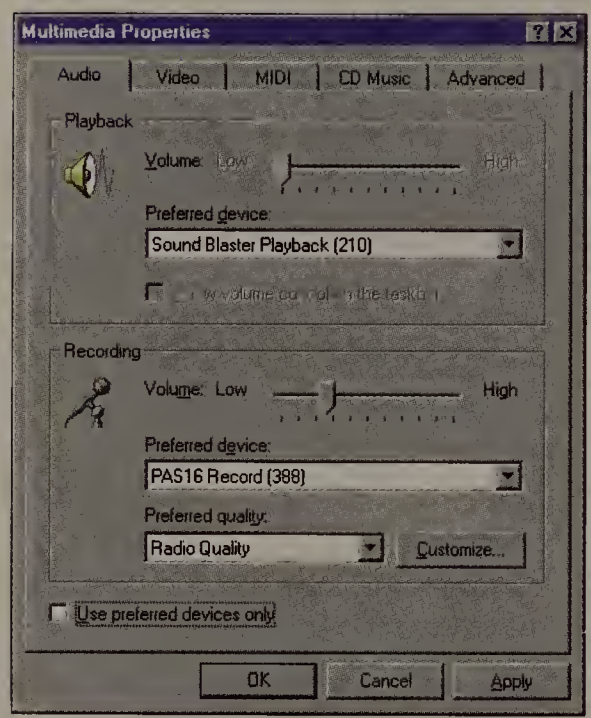

FIGURE 1: TALK NORMALLY OVER THE INTERNET by tricking your Pro Audio Spectrum board with the settings shown here.

Media Vision's Pro Audio Spectrum products are half-duplex sound boards, but they have a unique feature that lets them function like full-duplex boards. The Pro Audio Spectrum series (including the Pro Audio Studio) gives you Sound Blaster quality by using a separate, dedicated hardware section—it's like having two separate boards in one slot. To get the full-duplex effect under Win 95, install a Pro Audio board, then select *Start•Settings•Control Panel*, double-click the *Multimedia* icon, and click the *Audio* tab. Choose the Pro Audio Spectrum board, which is listed as *PAS16 Record (388)*, as your preferred recording device, and *Sound Blaster Playback (210)* as your preferred playback device; then click *OK* (see **FIGURE 1**).

To see the Sound Blaster emulation as a choice in the Playback section's 'Preferred device' list, you may first need to choose a Basic configuration. Choose *Start•Settings•Control Panel*, double-click the *System* icon, click the *Device Manager* tab, double-click your Pro Audio Spectrum board's icon under the 'Sound, video and game controllers' branch, click the *Resources* tab, click the *Use automatic settings* box to deselect it, choose *Basic configuration 1* or *Basic configuration 2* from the *Setting based on* list, and click *OK*.

VIDEO CDS—ON A PC NEAR YOU!

EVER NOTICE THOSE personal TV screens in first class as you wander back to coach? If you have a fast multimedia-equipped laptop, you can watch Robert Duvall in *Apocalypse Now* at 35,000 feet as you download your mail while everybody else suffers through *Bunting's World*.

Video CDs contain up to 70 minutes of MPEG-1 compressed video with quality like that of a VHS tape (see **FIGURE 2**), and the medium is compact and durable.

Most of the Pentium PCs sold today will play Video CDs without additional hardware. All you need is a software MPEG player such as Microsoft's free ActiveMovie Player (http://www.microsoft.com/imedia/activemovie/activem.htm), or CompCore's SoftPEG 2.0 (a demo version is available from http://www.compcore.com/TESTDRIV.HTM).

Most 90-MHz Pentium systems are fast enough to play MPEG, but if you want to play your Video CD in full-screen resolution, rather than the original size of 352 by 240 pixels, you may want to invest in MPEG playback hardware. Sigma Designs' $299 RealMagic Maxima is an ISA-bus MPEG decoder that lets you scale MPEG-1 clips as large as 1280 by 1024 pixels. Several video board manufacturers sell MPEG decoder add-ons for their products that do the same job.

The toughest part of playing Video CDs today is finding them. You can order hundreds of titles over the phone from the following vendors: Philips Media, located in Los Angeles, one of the main Video CD publishers (800/340-7888); D-Media of Westminster, California (800/332-8226 or 888/236-6843); and Carl Industries of Miami (305/594-7784). Video CD titles are priced like other video media, from $15 to $40, depending on content.

• RealMagic Maxima $299; Sigma Designs; 800/845-8086; http://www.tile.net/tile/vendors/sigmadesigns.html

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FIGURE 2: WATCH YOUR FAVORITE MOVIE on Video CD while you download your mail. (Here's Robert Duvall in Apocalypse Now.)

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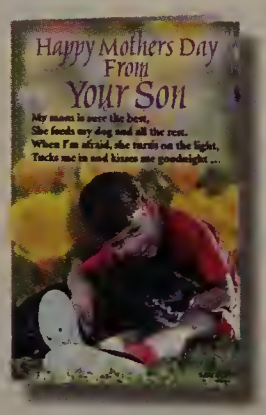

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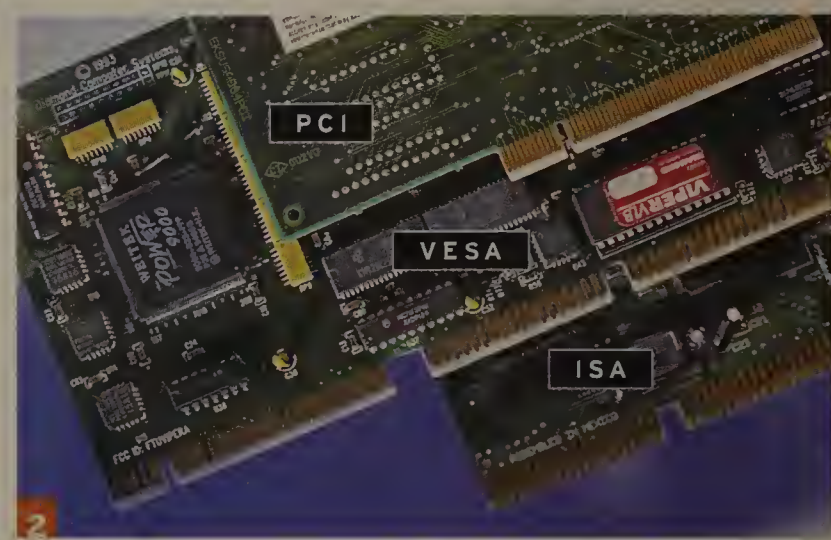
Add a New Graphics Card

Today's graphics cards rip through once-daunting tasks like running full-motion video, and you can often buy one for half what you would have paid a year ago. These cards can help you grind through many of your toughest jobs—or lure you away from them by making the new 3-D games even more compelling!

For buying tips, see "Upgrades: The Best for the Buck" (November 1996). For the latest review, see *Top 10 Graphics Boards* in this issue. One warning: Your existing monitor may not be able to handle all that a new graphics card can do. Changing your graphics card can be one of the easiest upgrades, but remember the basics shown here. For additional hints and tips, check PC World Online (http://www.pcworld.com/hereshow/).

Stan Miastkowski is a PC World *contributing editor.*

Check your graphics. Before deciding what to buy, see whether your existing motherboard handles ISA, VESA local bus, or PCI cards—or a mixture. Check your manual, or open your PC case and find the existing graphics card (attached to the monitor). If necessary, unhook the monitor and remove the card to look at its slot. In case graphics are built into the motherboard, read the next paragraph.

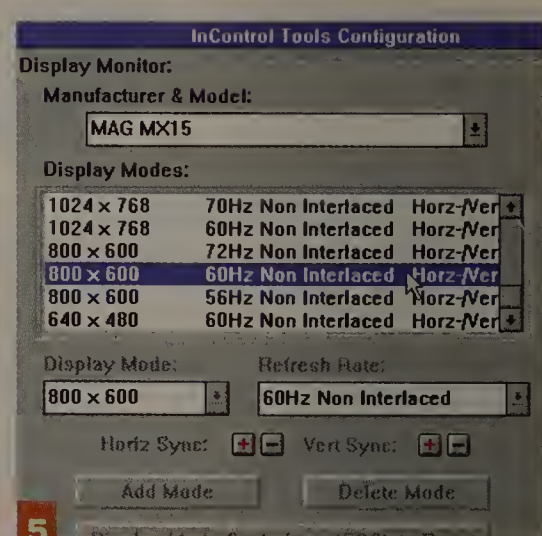


If graphics are built into the motherboard instead of on a card, you can still install a card, but read your manual or call your dealer to find out how to disable the onboard graphics. With some motherboards you need to move a jumper, flip a tiny DIP switch, or change a setting in your BIOS. Other motherboards switch off the onboard graphics automatically as soon as you plug in a card.

Buy your new card. If your PC's motherboard has a PCI bus, you'll find the widest selection of cards ranging from inexpensive to high-end. If your PC has a VESA local bus or an ISA bus, choices are more limited, the performance boost won't be as great, and the chance of installation hassles increases. Given the option, always choose a PCI or VESA graphics card over an ISA graphics card.

Prepare your software. If you're running Windows 95, you don't need to make any software changes before installing the new card. If you're a Windows 3.*x* user, exit to DOS (don't just open a DOS box), run the setup program located in the \windows directory, and change the Display setting to VGA before installing your new card.

Install the board. Unplug the monitor, remove the PC case, and remove the old graphics card, or disable the built-in graphics adapter if that's what you have. Ground yourself by touching the metal casing of your PC, grab the new card, and plug it in. Firmly tighten the screw that holds it in. Connect the monitor to the new card, but don't put the case back on yet.



Install the software. Software drivers should come with the new card. Turn on your PC. If you're running Windows 95, it should sense that a new card has been installed and ask you to insert the proper driver. If you're running Windows 3.*x*, you must install the driver manually. If everything's working, turn your PC off and put the cover back on. ■

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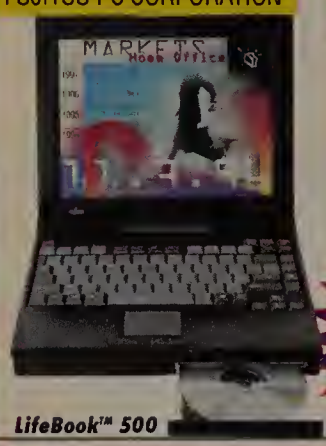

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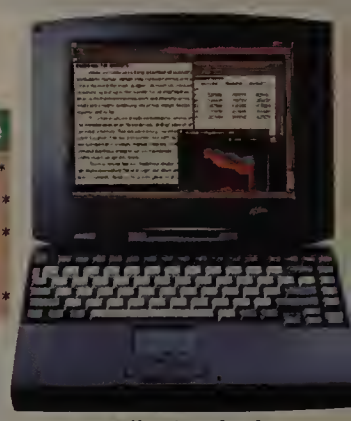
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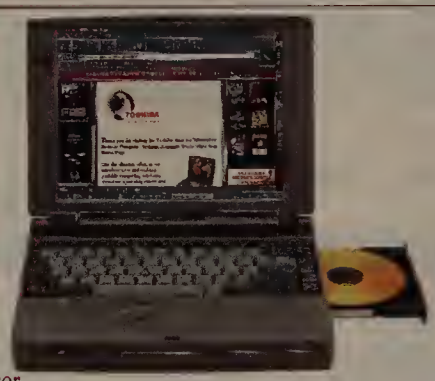
Satellite 200CDS

Model	CPU	Screen	RAM/HD	CD	Price
200CDS	100MHz	11.3" Dual Scan	8/810MB	6X	$1978

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Satellite Pro 420

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760E	150MHz	12.1" Active	16MB/2.1GB	Opt.	5799
760ED	133MHz	12.1" Active	16MB/2.1GB	6X	6299

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4110	100MHz	11.3" Dual Scan	8/810MB	Opt.	2479 *
4110D	100MHz	11.3" Dual Scan	8/810MB	4X	2899 *
4120	120MHz	11.3" Dual Scan	16MB/1.1G8	Opt.	2999 *
4120T	120MHz	11.8" Active	16/810MB	Opt.	3699 *
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5280	120MHz	11.3" Active	16M8/1.35GB	Opt.	4349
5200	120MHz	10.4" Active	8MB/1.35GB	Opt.	4720
5300	133MHz	12.1" Active	16MB/1.35GB	Opt.	4749
5380	133MHz	12.1" Active	16MB/2.2GB	Opt.	6299

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6030H	133MHz	12.1" Active	16MB/1.3G8	6X	4999
6030X	133MHz	12.1" Active	16MB/1.4G8	6X	5399

NEC Versa 4200

Model	CPU	Screen	RAM/HD	CD	Price
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4230	133MHz	10.4" Active	8M8/1.0GB	6X	3899

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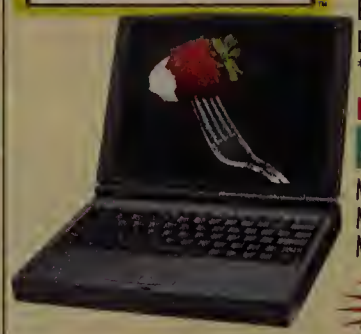
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Hitachi E™ Series

Model	CPU	Screen	RAM/HD	CD	Price
E100D	100MHz	11.3" Dual Scan	16/810MB	Opt.	$1799
E133DN	133MHz	11.3" Dual Scan	16/1.08GB	Opt.	1999
E133T	133MHz	11.3" Active	16/810MB	Opt.	2499*

* After $100 instant rebate

Hitachi M™ Series

Model	CPU	Screen	RAM/HD	CD	Price
M100D	100MHz	11.3" Dual Scan	8/B10MB	4X	$1999
M120T	120MHz	11.8" Active	16MB/1G8	4X	2999
M133T	133MHz	11.8" Active	16MB/1G8	6X	3499

NEW MODELS

Additional M™ series models available. Call for details.

TEXAS INSTRUMENTS

Extensa 600CD

Extensa 600

Model	CPU	Screen	RAM/HD	CD	Price
600CD	120 MHz	12.1" Dual Scan	8/810M8	6X	$2249

TravelMate 6000

Model	CPU	Screen	RAM/HD	CD	Price
6020	120MHz	11.3" Active	16MB/1.08GB	6X	$3799
6030	133MHz	12.1" Active	16M8/1.35G8	Opt.	4299
6050	150MHz	12.1" Active	16MB/1.35GB	Opt.	4699

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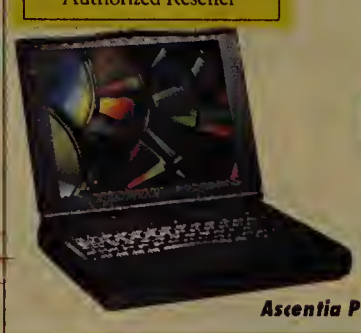
Ascentia P

AST Ascentia P

Model	CPU	Screen	RAM/HD	CD	Price
A40	120MHz	11.3" Dual Scan	16M8/1.0G8	6X	$ 2399
A40	120MHz	12.1" Active	16MB/1.0GB	6X	2999
P50	133MHz	12.1" Active	24MB/1.0GB	4X	3899
P50	133MHz	12.1" Active	24MB/2.1G8	4X	4299

AST Ascentia J

Model	CPU	Screen	RAM/HD	CD	Price
J30	100MHz	10.4" Dual Scan	8/800MB	Opt.	$1699
J30	100MHz	10.4" Active	8/800MB	Opt.	1799
J50	133MHz	10.4" Active Matrix	B/800M8	Opt.	2249

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Additional Ascentia J™ models available. Call for details.

SHARP

Sharp WideNote

Sharp WideNote

Model	CPU	Screen	RAM/HD	CD	Price
W100D	133MHz	11.2" Wide Dual Scan	16MB/1.1GB	Opt.	$2999
W100T	133MHz	11.2" Wide Active	16MB/1.1GB	Opt.	3499

Sharp 3000 & 9000

Model	CPU	Screen	RAM/HD	CD	Price
3040	100MHz	12.1" Dual Scan	8MB/1.1G8	Opt.	$1599
9020	120MHz	12.1" Dual Scan	16M8/1.1GB	6X	2499
9050	133MHz	11.3" Active (SHA)	16MB/1.1G8	6X	2999
90B0	133MHz	12.1" Active (SHA)	16MB/1.3GB	6X	4499

Additional models available. Call for details.

olivetti personal computers

Olivetti Echos Series Notebook

Olivetti Echos

Model	CPU	Screen	RAM/HD	CD	Price
Echos	100MHz	11.3" Dual Scan	8M8/1.3G8	6X	$1999
Echos	100MHz	10.4" Active	8M8/1.3GB	6X	2599
Echos	120MHz	11.3" Active	8MB/1.3G8	6X	2999
Echos	133MHz	11.8" Active	16MB/1.3G8	6X	3499
Pro	133MHz	12.1" Dual Scan	16M8/1.3GB	8X	3499
Pro	133MHz	12.1" Active	16MB/2GB	8X	3999
Pro	150MHz	12.1" Active	16M8/2GB	8X	4999

6X CD-ROM

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Digital HiNote VP & VP 500

Model	CPU	Screen	RAM/HD	CD	Price
HiNote VP	120MHz	11.3" Dual Scan	8/1.0BMB	Opt.	$1799
VP 500	120MHz	11.3" Dual Scan	BMB/1.08GB	6X	2449
VP 500	133MHz	12.1" Active	BM8/1.44GB	6X	3599

Digital Ultra

Model	CPU	Screen	RAM/HD	CD	Price
Ultra II	133MHz	11.3" Active	16MB/1.35GB	Opt.	$4499
Ultra II	150MHz	11.3" Active	16MB/1.44G	Opt.	4799

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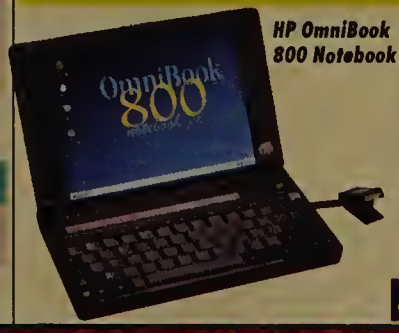
HP OmniBook 800 Notebook PC

HP OmniBook 800

Model	CPU	Screen	RAM/HD	CD	Price
800CS	100MHz	10" Dual Scan	16/810MB	Opt.	$2999
800CT	133MHz	10.4" Active	16MB/1.4GB	Opt.	4279

HP OmniBook 5500

Model	CPU	Screen	RAM/HD	CD	Price
5500CTS	120MHz	10.4" Active	16MB/1.35GB	Opt.	$3699
5500CTS	133MHz	12.1" Active	16MB/1.35GB	Opt.	4519
5500CTS	133MHz	12.1" Active	16MB/2GB	Opt.	4659

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Model	CPU	RAM/HD	CD	Price
S64	166MHz	16MB/2.5GB	8X	$2249
S66	166MHz	16MB/3.2GB	8X	2399
S74	200MHz	16MB/2.5GB	8X	2399
S78	200MHz	16MB/3.5GB	8X	2699

Aptiva S Series Monitors

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MM50	15"	13.7"	1024 x 768	$499
MM70	17"	15.7"	1024 x 768	799

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4704	133MHz	16MB/1.6GB	6X	$1599
4712	166MHz	24MB/2.5GB	6X	1899
4716	200MHz	32MB/2.5GB	8X	2199

Presario Monitors

Model	Size	View	Resolution	Price
Presario	14"	12.9"	1024 x 768	$399
Presario	15"	13.5"	1024 x 768	499
Presario	17"	15.6"	1280 x 1024	749

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7130	133MHz	16MB/1.6GB	8X	$1599
7160	166MHz	16MB/2.1GB	8X	1799
7200	200MHz	16MB/3.0GB	8X	2799

Infinia Monitors

Model	Size	View	Resolution	Price
Infinia	15"	13.78"	1280 x 1024	$459
Infinia	17"	16.23"	1280 x 1024	759

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Model	CPU	RAM/HD	CD	Price
VAIO	166MHz	32MB/2.1GB	8X	$2299
VAIO	200MHz	32MB/2.5GB	8X	2599

VAIO Monitor

Model	Size	View	Price
VAIO	15"	13.9"	$579

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9308	166MHz	24MB/2.5GB	8X	1899 *
9310	166MHz	24MB/2.5GB	8X	2199 *
9312	166MHz	24MB/2.5GB	8X	2299
9315	166MHz	32MB/2.5GB	8X	2399 *
9314	200MHz	24MB/4.0GB	8X	2299
9316	200MHz	32MB/3.0GB	8X	2699

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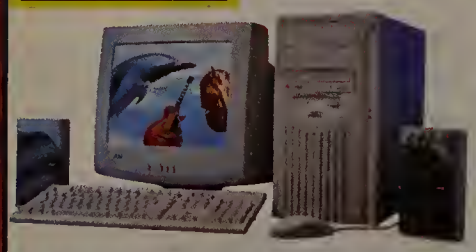

AST Advantage Multimedia

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NEC

Monitors priced seporotely

NEC Ready Multimedia
Product differs slightly from photo

Ready Multimedia

Model	CPU	RAM/HD	CD	Price
7622	120MHz	16MB/1.6GB	8X	$1599
9620	133MHz	16MB/1.6GB	8X	1699
9624	133MHz	16MB/2.0GB	8X	1899
9622	166MHz	16MB/2.5GB	8X	2099
9628	166MHz	32MB/3.2GB	8X	2599
9629	200MHz	32MB/3.2GB	8X	2699

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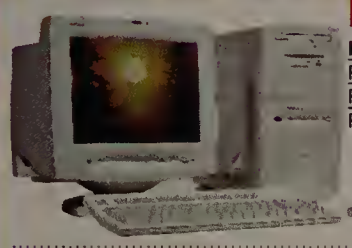

PRODUCT	PART #	PRICE
Pentium 90, 8MB, 1.2GB, Pavilion 7030	7030	$ 899
Pentium 120, 16MB, 1.6GB, Pavilion 7055	7055	1299
Pentium 133, 16MB, 1.6GB, Pavilion 7125	7125	1449

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Product shown with optional CD
PC-6110-71602-R
DESCRIPTION
Pentium 90, 8MB, 810MB

Product differs from photo
PC602011602MX-R
DESCRIPTION
Pentium 75, 8MB, 810MB

Toshiba Satellite 105CS & Satellite Pro 405CS

$999 $1099

FR FR

Satellite 105CS
PA1217U-S6WB
DESCRIPTION
Pentium 75, 8MB, 504MB

Product differs from photo
PA1207U-S6WB
DESCRIPTION
Pentium 75, 8MB, 772MB

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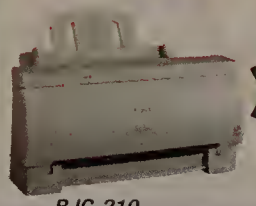

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Multimedia	PCS8A-01R6	189.00

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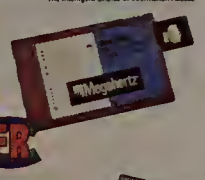

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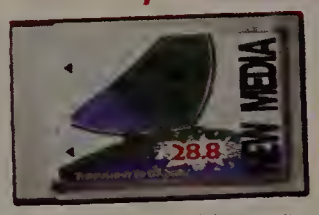

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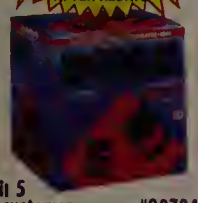

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34318	Pentium/150	4122	16MB/2.5GB	8X	1495*

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Item #	Processor	Model	RAM/HD	Price
31558	Pentium/100	5100	8MB/1.2GB	$1099
31559	Pentium/100	5100	16MB/1.2GB	1249
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32953	AMD K5-100	8MB/850MB	999
30476	CYRIX P150+	16MB/2GB	1199
31853	CYRIX P200+	32MB/2.5GB	1699

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Item #	Processor	Model	RAM/HD	Price
29152	AcerNote Light	361	8MB/810MB	$1798
30155	AcerNote Light	359	16MB/810MB	1798
32508	AcerNote Light	363	16MB/1.0GB	2098
33495	AcerNote Light	372	16MB/1.0GB	2398

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30438	Satellite Pro 420CDT	8MB/1.2GB	3298
30440	Tecra 500CS	16MB/1.2GB	3549

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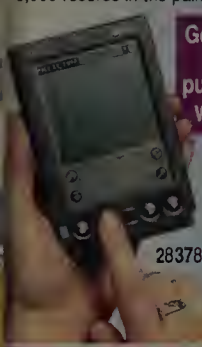

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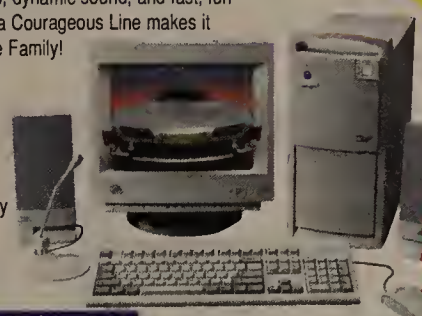

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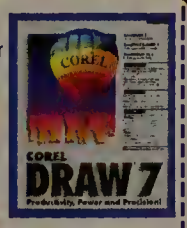

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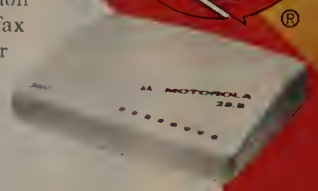

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1Megx1	–	5.00	4.00	2.00	2.00
1Megx4	–	19.00	18.00	17.00	–
1Megx4 (Zip Pk)	–	12.00	11.00	10.00	–
256x4(Page Dip)	–	7.25	6.75	6.50	5.95
256 4(Static Dip)	–	–	9.95	–	–
256x4(Page Zip)	–	9.25	9.00	8.95	–
256x4(Video Zip)	–	–	10.95	9.95	7.95
256x8(SOJ)	–	12.00	11.00	–	–
256x16 SOJ	–	39.00	29.00	–	–
256x16 SOJ Edo	–	39.00	–	–	–
256x16 Video Zip	–	49.00	39.00	–	–

INTEL Math Chips

80287-XL	49.00
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SIMM MODULES (Add $5.00 for SIPP)

	40NS	50NS	60NS	70NS	80NS	100NS
256 x 9	–	–	–	6.00	5.00	5.00
1Meg x 9 (3 chip)	–	–	16.00	13.00	13.00	–
1Meg x 9 (9 chip)	–	–	22.00	19.00	14.00	14.00
4Meg x 9	–	–	41.00	39.00	39.00	–
16Meg x 9 (9 chip)	–	–	179.00	169.00	169.00	–

72 PIN SIMMS (FPM, EDO)

	60NS	70NS	80NS
256 x 36 1 mg	19.00	19.00	19.00
512 x 36 2 mg	36.00	34.00	34.00
1 meg x 36 4 mg	44.00	39.00	39.00
2 x 36 8 mg	74.00	69.00	69.00
4 x 36 16 mg	124.00	119.00	119.00
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2 x 32 8 mg	54.00	49.00	49.00
4 x 32 16 mg	109.00	104.00	104.00
8 x 32 32 mg	199.00	189.00	189.00
16 x 32 64 mg	509.00	499.00	499.00
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2 x 32 8 mg EDO	54.00	49.00	49.00
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8 x 32 32 mg EDO	199.00	189.00	189.00

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8 x 64	64Meg	449.00
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3.3V ECC, EDD	8Meg	106.00
3.3V ECC, EDD	16Meg	209.00
3.3V ECC, EDD	32Meg	329.00
3.3V ECC, EDD	64Meg	709.00
DELL & GATEWAY		
3.3V SDRAM	*8Meg*	*109.00*
3.3V SDRAM	*16Meg*	*299.00*
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16Meg	159.00	64Meg	2349.00
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Advantage Adventure 4000	4Meg/16Meg	39/124
Advantage Adventure 6000	4Meg/8Meg/16Meg/32Meg/64Meg	39/78/124/248/469
Advantage Adventure 8000	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Advantage Pro 486 SX33, SX25	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Bravo LC	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Bravo LC 5100, 5133, 5166 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/69/144/249
Bravo MS	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Bravo MS 5100, 133, 166 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/69/144/249
Bravo MS-T 6150 (pairs)	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Manhattan G, V (pairs)	8Meg/16Meg/32Meg	69/129/239
Premmia 4/33, 4/50, MTE 433 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/129/239
Premmia 4/66D, SE 4/33, 4/66 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/129/239
Premmia LX P/60, MX 4/66, P75	4Meg/8Meg/16Meg/32Meg	34/59/119/219

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NEC MEMORY

Ready 5010, 7010, 7020, 9010, 9022 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Ready 9510, 9520, 9522, 9530, 9532 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Ready 7022 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/69/129/249
Image P60, P90, 0, P100E (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/129/249

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Netserver LE 486SX33 – 486DX2/66	4Meg/8Meg/16Meg/32Meg	49/79/129/249
Netserver LH Plus 5/133, 5/166 (EDD, ECC)	16Meg/32Meg/64Meg/128Meg	Call
Netserver 4/33LM – 5/100LM (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/249
Netserver 5/75LS – 5/133 LS4 (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/249
Pavillion 5010-7170 (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/129/249
Vectra 500 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra VA 6/180, 6/200 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra VE2 5/75 – 5/133 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra XA 6/180, 6/200 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
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Aptiva 700 Series (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Aptiva A Series (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Aptiva C Series (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/249
Aptiva M Series	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 330 Models 6571-6576	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 330 Model 6577 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/249
PC 340 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/249
PC 350 Models 6581-6585	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 350 Model 6586 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 350 Model 6587 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/219
PC 360	4Meg/8Meg/16Meg/32Meg	44/69/129/229
PC 730 Models 6875-6876 (pairs)	4Meg/8Meg/16Meg/32Meg	49/69/139/259
PC 730 Model 6877 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/219
PC 750 Models 6885-6886 (pairs)	4Meg/8Meg/18Meg/32Meg	49/89/139/259
PC 750 Model 6887 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/219
PC Server 310 (pairs)	4Meg/8Meg/16Meg/32Meg	49/69/139/259
PC Server 500 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249
P/S 1, 30 Pin Simms	1/Meg/4Meg	12/39
P/S 1, 72 Pin Simms	4Meg/8Meg/16Meg/32Meg	49/79/139/249
P/S 2, 55SX, 65SX	4Meg	49
P/S 2, 53, 53LS, 58, 57	4Meg/8Meg	49/79
P/S 2, 95XP (ECC, pairs)	4Meg/8Meg	49/79
P/S 2 Server, 95, 195, 295 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249

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IBM NOTEBOOK & LAPTOP MEMORY

Thinkpad 340, 345, 355, 360, C, CE	4Meg/8Meg/16Meg	49/109/189
Thinkpad 365C, CS, CD, E, ED	4Meg/16Meg	79/209
Thinkpad 365X, 365XD	8Meg/16Meg/32Meg	109/189/539
Thinkpad 500, 510CS	4Meg/8Meg/16Meg	79/109/219
Thinkpad 560	8Meg/16Meg/32Meg	109/189/539
Thinkpad 700, 720, 750, CL57SX	4Meg/8Meg/16Meg/32Meg	49/109/189379
Thinkpad 701, 701C	4Meg/8Meg/16Meg/32Meg	69/109/169/749
Thinkpad 730T, TE	4Meg/8Meg/16Meg	49/109/189
Thinkpad 755C, CE, CD, CS	4Meg/8Meg/16Meg/32Meg	49/109/179/339
Thinkpad 760C, CD, L, LD	4Meg/8Meg/16Meg/32Meg	99/179/339
Thinkpad 760E, ED, EL, ELD	8Meg/16Meg/32Meg	109/189/539

COMPAQ MEMORY MODULES

Deskpro 486/25, 33L, 50L	2Meg/8Meg/32Meg	39/99/249
Deskpro 3/25I, 33I, 4/25IS, 66I	2Meg/4Meg/8Meg	39/69/89
Deskpro 386, 486 M Series	2Meg/4Meg/8Meg	39/69/89
Deskpro M Series Expansion Board	0K (no memory)	119.00
Deskpro 450, 4100, 575, 590, 5100, 5133	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Deskpro 575, 5120, 5133, 5150, 5160 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/139/249
Deskpro 2000, 4000, 6000 Series (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/139/249
Deskpro 5/60M, 5/66M, XE560 (quads)	2Meg/4Meg/8Meg/16Meg/32Meg	39/49/69/139/239
Deskpro XL (pairs)	4Meg/8Meg/16Meg/32Meg	39/49/69/139/239
Deskpro XL 6150, 6200 (ECC, pairs)	8Meg/16Meg/32Meg/64Meg, 128Meg	Call
Presario 510, 520, 524, 660, 720, 724, 860	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Presario 920, 924, 954, 974, 978, 992	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Presario 833, 850, 860, 866	4Meg/8Meg/16Meg/32Meg	39/64/119/239
Presario 5528, 7110, 7152	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Presario 7170, 7180, 9536, 9546, 9548, 9564 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Presario 9232, 9234, 9240, 9250, 9642, 9660 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Proliant 1000 5/60, 2000, R, 4000, R (quads)	4Meg/8Meg/16Meg/32Meg	39/64/119/239
Proliant 1500, 1500R (pairs)	4Meg/8Meg/16Meg/32Meg	39/64/119/239
Proliant 4500, 4500R (quads)	4Meg/8Meg/16Meg/32Meg/64Meg	39/64/119/239/599
Proliant 5000, 5000R (pairs)	32Meg/64Meg/128Meg/256Meg	Call
Prolinea 4/25S, 4/33, 4/66	2Meg/4Meg/8Meg	39/49/69
Prolinea (enhanced), MT	4Meg/8Meg/16Meg/32Meg	49/69/129/229
Prolinea 575, 590, 5100, 5120, 5133 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Prolinea 5100, 5120, 5133, 5150, 5166 (EDD pairs)	4Meg/8Meg/16Meg/32Meg	39/69/139/259
Prolinea 575E, 100E, 120E, 575MX (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Prolinea 590MX, 5120MX (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Prolinea 6150E, 6180E (pairs)	8Meg/16Meg/32Meg	69/119/239
Prosignia 300 5/75, 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/259
Prosignia 500 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/259

COMPAQ NOTEBOOK & LAPTOP MEMORY

Armada 1120, T	8Meg/16Meg/32Meg/64Meg	119/199/Call/Call
Armada 4100, 4110, 4120, 4130	8Meg/16Meg/32Meg Kit	Call
Concerto 4/25, 433	4Meg/8Meg/16Meg	79/99/169
Contura 4/25, C, CX	4Meg/8Meg/16Meg	79/99/169
Contura 400C, 400CX, 410C, 410CX	4Meg/8Meg/16Meg	79/99/169
Contura 420C, 420CX, 430C, 430CX	4Meg/8Meg/16Meg/24Meg	49/79/169/239
Contura Aero 4/25, 4/33	4Meg/8Meg/16Meg	69/99/169
LTE 5000, 5100, 5200, 5300	8Meg/16Meg/32Meg/64 Meg Kit	99/149/266/513
LTE Elite 4140C, CX, 4/75CX	4Meg/8Meg/16Meg/24Meg	49/89/179/249

LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	OK Bd	256k	1	2	3	3.5	4	5	6	8	16	32
Brother 630, 631, 641, 645	–	–	69	89	–	–	–	–	–	–	–	–
Canon LBP 430	–	–	39	–	–	–	49	–	–	–	–	–
Canon LBP 860, 1260	–	–	–	39	–	–	69	–	–	94	144	309
Canon LBP4, 4Lite, 4plus	–	–	129	179	–	–	–	–	–	–	–	–
Epson 6000, Action Laser	–	–	–	129	–	–	229	–	–	–	–	–
Epson Action Laser 1100, 1600	–	–	69	70	–	–	99	–	–	199	359	–
Epson Action Laser II	–	–	74	–	173	–	–	272	–	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	–	89	–	173	–	–	272	–	–	–	–
Epson 1000, 1500, 5000, 5200	–	–	–	89	–	–	178	–	–	–	–	–
HP 2, 2D–	–	–	–	69	–	–	99	–	–	–	–	–
HP 3, 3D, 3P, 2P 2P+	–	–	–	*69*	–	–	*99*	–	–	–	–	–
HP 4, 4M, 4Si, 4SIMX	–	–	–	49	–	–	59	–	–	99	–	–
HP 4P, 4PLUS, 4MPm 1600, 1600CM	–	–	19	29	–	–	49	–	–	89	–	–
HP 4L	–	–	34	–	–	–	–	–	–	–	–	–
HP 3Si	–	–	39	–	–	–	69	–	–	99	–	–
HP 5L	–	–	49	74	–	–	89	–	–	199	–	–
HP 5P, 5MP, 4V, 4MV	–	–	19	39	–	–	49	–	–	89	124	–
HP Design Jet 600, 650, 200	–	–	–	39	–	–	49	–	–	89	139	239
HP Deskjet 500, 500C, 510, 550,560	–	*34*	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	39	–	–	49	–	–	89	–	–
HP Paintjet XL300	54	–	–	–	–	–	69	–	–	144	299	–
IBM Laser 4019, 4019E	–	–	–	–	139	–	–	–	–	–	–	–
IBM Laser 4029, 4037	–	–	–	–	–	–	89	–	–	–	–	–
IBM Laser 4039, 4079	–	–	–	*69*	–	–	*89*	–	–	*189*	–	–
Konica LP-3110, 3115	–	–	119	189	239	–	–	–	–	–	–	–
Lexmark Medley 4C, 4x, 4SX	–	–	Call	Call	Call	–	–	–	–	–	–	–
Lexmark, Optra L, LX, R, RX	–	–	–	–	–	–	59	–	–	94	139	259
Lexmark Valuwriter 300,600	–	–	29	39	–	–	89	–	–	–	–	–
Lexmark Winwriter 200, 400, 600	–	–	29	39	–	–	89	–	–	–	–	–
NEC 90, 290	–	–	–	89	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	79	–	–	–	–	–	–	–	–
Oki 400	–	–	–	79	–	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	–	89	109	169	–	189	–	–	–	–	–
Oki 810E, EX, 600E, EX, 610E, EX	–	–	29	39	–	–	79	–	–	119	179	–
Oki 830, 840	–	–	–	89	–	–	–	–	–	–	–	–
Oki 2350, 2450	–	–	Call	Call	–	–	–	–	–	–	–	–
Packard Bell PB 9500	–	–	–	139	–	–	227	–	–	–	–	–
Packard Bell 9815	–	–	–	139	–	–	229	–	–	–	–	–
Panasonic 4420/4450I	–	–	–	99	–	–	169	–	–	–	–	–
Panasonic 4410/443D	–	–	–	*89*	–	–	*129*	–	–	–	–	–
Panasonic 4450	–	–	89	–	–	–	–	–	–	–	–	–
Panasonic 4400/5400	–	–	89	99	–	–	189	–	–	–	–	–
Panasonic 4440, 5410, 6500	–	–	79	99	–	–	159	–	–	–	–	–
Sharp 9400, 9480, 9600, 9700E	–	–	69	99	–	–	149	–	–	–	–	–
Sharp 9500, E, H, 9700, H	–	–	79	–	–	–	259	–	–	–	–	–
TI XL/PS17/PS35	–	–	49	–	–	–	–	–	–	–	–	–
TI Microlaser Pro E, Powerpro, Pro 600	–	–	89	129	–	–	189	–	–	329	–	–
TI Microwriter	–	–	79	119	–	–	–	–	–	–	–	–

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NEC Versa E, V — $119.00
NEC Versa S — $119.00
Toshiba 610 and 400 — Call
Toshiba 1900, 1910, 1950, 1960 — $119.00
Toshiba 2400, 4700, 4800, 4900 — $119.00
Toshiba 2100 Series — $121.00

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
Tecra 500/P650	*8Meg/16Meg/32Meg/48Meg/126Meg*		*119/239/459/Call/Call*
Tecra 700 (SDRAM)	*8Meg/16Meg/32Meg*		*119/259/429*
Tecra 710, 720	*6Meg/16Meg/32Meg/84Meg/126Meg*		*119/259/429/Call/Call*
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2000U	94.00
T2100, 2105, 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg		69/89/169/229
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	69.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	PC-PA2013U	79.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg/32Meg	PC-PA2014U	159/279
T3400CT, T2400, T3600	4Meg/8Meg/16Meg/24Meg	PC-PA2019U	89/119/179/Call
T199, 195, 119, 115	*8Meg/16Meg/32Meg*		*119/189/319*
T409, 495, 419, 415, 429, 425	*6Meg/16Meg/32Meg*		*119/169/319*
T499CS, 499CDT, T109, 105 Edo	*8Meg/16Meg/32Meg*		*110/169/319*
T600, 610, CT Edo	8Meg/16Meg/32Meg		119/189/319

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ACERNote 730C, 735C, 760C, 760CX, 780CX	2Meg/4Meg/8Meg		49/69/99
ACERNote 763, 765, 782, 784, 786	4Meg/8Meg/16Meg		59/79/159
ACERNote Light 350, 352, 355	4Meg/8Meg/16Meg		69/99/169
ACERNote Light 356, 358, 359, 361 (pairs)	4Meg/8Meg/16Meg		69/99/169
ACERNote Pro 950, 954, 955, 957, 959 (pairs)	4Meg/8Meg/16Meg		79/109/189
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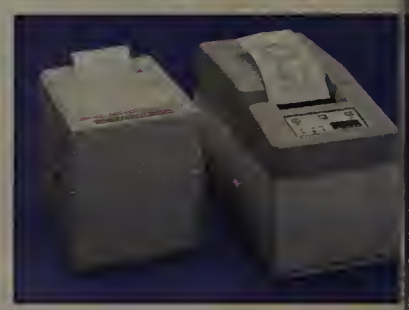

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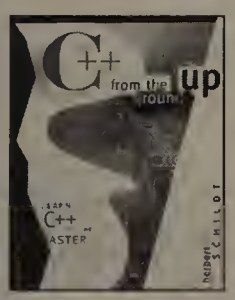

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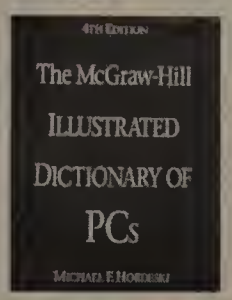

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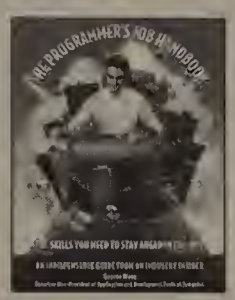

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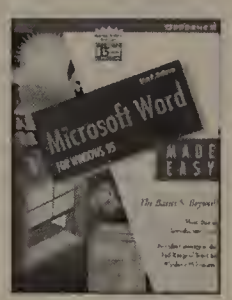

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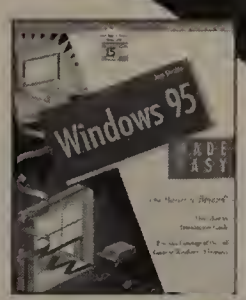

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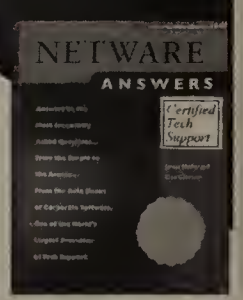

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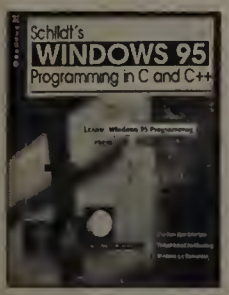

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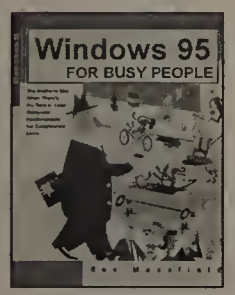

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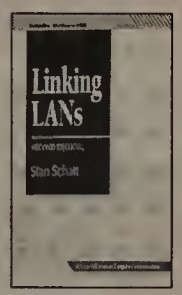

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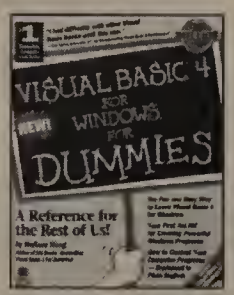

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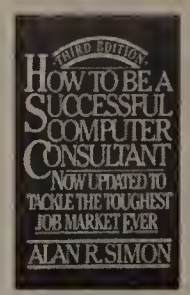

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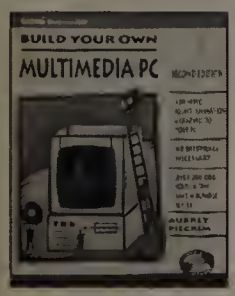

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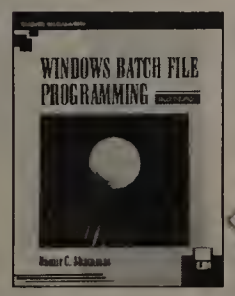

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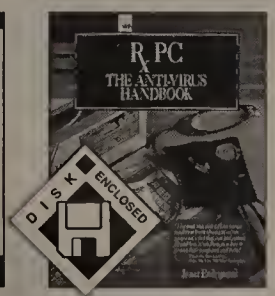

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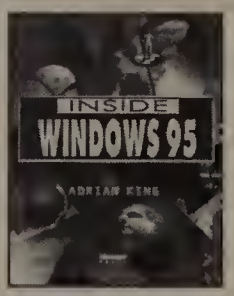

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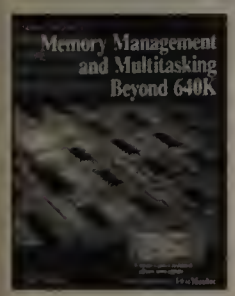

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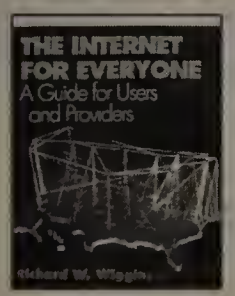

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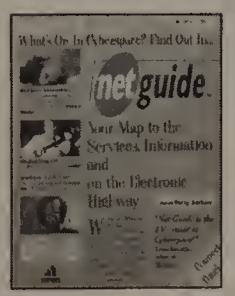

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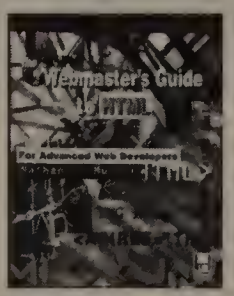

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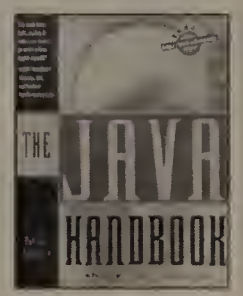

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-Also supports Macintosh (GEAR)	
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-Supports Windows 3.1, 95, NT	
-Creates hybrid CDs for PC/Mac/Unix (CDRHYWIN)	
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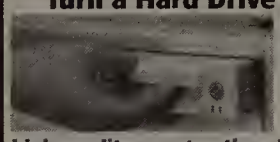

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230MB	Smart Storage Solutions SCSI	$339
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640MB	Fujitsu (230MB backwards compatible)	$555
650MB	Toray 4xCD and 640MB Optical comb.	$499
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Teac	4X Write 4X Read	$829
Smart Storage Solutions	4X Write 4X Read	$889
Yamaha	4X Write 4X Read	$819

• CD ROM DRIVES •

Brand	Spin	Model	Speed	Int	Ext
SCSI					
NEC	4X	CDR222	200ms	$99	$189
Plextor	6X	PX63CS	145ms	$269	$359
Philips	8X	PC80S	195ms	$205	$295
NEC	8X	CDR1410	145ms	$205	$295
Plextor	8X	PX83CS	115ms	$299	$389
Pioneer	10X	DRU10XSCSI	140ms	$225	$315
Plextor	12X	PX12TS	105ms	$319	$409
Plextor	12X	PX12CS	105ms	$349	$439
ATAPI IDE				**Int**	**Int kit**
NEC	8X	CDR1400	140ms	$110	$140
Mitsumi	8X	CRMCFX800	150ms	$110	$140
Acer	10X	AC910A	150ms	$125	$155
Pioneer	10X	DRA10X	140ms	$135	$165
Lite On	12X	LTN126A	155ms	$129	$159
Acer	12X	AC612A	125ms	$149	$179
Mitsumi	12X	CRMCFX12X	150ms	$175	$205

IDE CD ROM CHANGER

NEC	4X	CDR4X4	4Disk	250ms	$99

SCSI CD ROM CHANGERS

Nakamichi	8X	MJ48S	4Disk	150ms	$399
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800MB	Seagate	TST800R	$119
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2GB	Hewlett Packard	C1534	$609
2-4GB	Seagate	C4324RP	$679
2-4GB	Hewlett Packard	C1536	$699
4-8GB	Sony	SDT5000	$809
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7-14GB	ExaByte	EXB8505XL	$1889
7-14GB	ExaByte	EXB8700LT	$1089
20-40GB	ExaByte	EXB8900	$5499
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SCSI DLT 20-40GB Quantum DLT4000 $4699

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Seagate Arcada for Windows NT (call for netware version) workstation/single server/enterprise $239/499/869

TAPEDISK, allows DAT drive to be used as hard drive under DOS/Win 3.1 Win 95 $189

• IDE HARD DRIVES •

IDE	Speed	RPM	Brand	Model	Wty	Price
540MB	14ms	3600	Seagate	ST3541A	3	$139
631MB	14ms	3600	Seagate	ST3630A	3	$145
850MB	10ms	4500	Western Digital	AC2B50	3	$165
850MB	14ms	3600	Seagate	ST3B51A	3	$155
1200MB	10ms	5400	Fujitsu	M1636T	3	$195
1275MB	12ms	4500	Seagate	ST31276A	3	$1B9
1280MB	11ms	4500	Quantum	TM31280A	3	$195
1281MB	11ms	5200	Western Digital	AC21200A	3	$199
1330MB	12ms	4480	Maxtor	M71336A	3	$195
1623MB	14ms	3600	Seagate	ST31621A	3	$212
1624MB	10ms	5200	Western Digital	AC21600	3	$219
1670MB	11ms	4480	Maxtor	M71670A	3	$215
1700MB	10ms	5400	Fujitsu	M1623T	3	$215
1700MB	12ms	4500	Seagate	ST31720A	3	$215
1700MB	11ms	4500	Quantum	SR31700A	3	$219
2004MB	11ms	4480	Maxtor	M72004A	3	$255
2100MB	11ms	5200	Western Digital	AC22100	3	$265
2100MB	9ms	5400	Fujitsu	M1624T	3	$249
2132MB	12.5ms	4500	Seagate	ST32132A	3	$270
2168MB	10.5ms	4500	Quantum	TM32160A	3	$259
2500MB	9ms	5400	Fujitsu	M1638T	3	$259
2550MB	15ms	3600	Quantum	BF2500A	3	$242
2559MB	11ms	5200	Western Digital	AC32500	3	$275
2560MB	11ms	5400	Seagate	ST5250A	3	$292
2700MB	12ms	4480	Maxtor	M72700A	3	$305
3166MB	12ms	5200	Western Digital	AC33100	3	$325
3254MB	10.5ms	4500	Quantum	TM33200A	3	$325
3500MB	12ms	4480	Maxtor	M83500A	3	$419
3840MB	10.5ms	4500	Quantum	TM33840A	3	$3B9

• SCSI HARD DRIVES •

SSCSI	Speed	RPM	Brand	Model	Wty	Int	Ext
1050MB	9ms	5400	Seagate	ST31055N	3	$349	$409
1280MB	12ms	4500	Quantum	TM31280S	3	$279	$339
2110MB	10.5ms	4500	Quantum	TM32110S	3	$375	$435
2147MB	9ms	5400	Seagate	ST32155N	5	$485	$545
2147MB	8ms	7200	Seagate	ST32550N	5	$729	$789
2150MB	9ms	5400	Seagate	ST32155N	5	$479	$539
2150MB	8ms	7200	Seagate	ST32171N	5	$739	$799
3254MB	10.5ms	4500	Quantum	TM33200S	3	$449	$509
4290MB	8ms	7200	Seagate	ST15230N	5	$885	$945
4350MB	8ms	7200	Seagate	ST34371N	5	$1145	$1205
4400MB	8ms	7200	Fujitsu	M2954S	5	$819	$879
4550MB	8ms	7200	Quantum	XP34550S	5	$999	$1059
9080MB	11ms	5400	Seagate	ST410800N	5	$1779	$1879
9100MB	9ms	7200	Seagate	ST19171N	5	$2085	$2145
9100MB	8ms	7200	Quantum	XP3900S	5	$1599	$1659
WIDE SCSI							
1050MB	9ms	5400	Seagate	ST31055W	5	$379	$509
2050MB	8.5ms	7200	Micropolis	MC4221	5	$545	$599
2050MB	8.5ms	7200	Micropolis	MC4221AV	5	$600	$660
2147MB	9ms	5400	Micropolis	MC4421	5	$379	$439
2147MB	9ms	5400	Micropolis	MC4421AV	5	$459	$519
2150MB	9ms	5400	Seagate	ST32155W	5	$529	$659
2150MB	8ms	7200	Seagate	ST32171W	5	$779	$909
4294MB	8ms	7200	Micropolis	MC3243	5	$829	$889
4294MB	8ms	7200	Micropolis	MC3243AV	5	$829	$945
4294MB	8ms	7200	Micropolis	MC3243W	5	$929	$1059
4294MB	8ms	7200	Micropolis	MC3243WD	5	$899	$1029
4294MB	8ms	7200	Micropolis	MC3243WAV	5	$999	$1139
4350MB	8ms	7200	Seagate	ST34371W	5	$1189	$1379
4550MB	8ms	7200	Quantum	XP34550W	5	$999	$1059
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9100MB	12ms	5400	Micropolis	MC1991AV	5	$1699	$1799
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Deskpro XL Series, Desktops, 16MB 189
Deskpro XL Series, Desktops, 32MB 332
Deskpro XL6/50, Desktops, 16MB 279
Deskpro XL6/50, Desktops, 32MB 362
Proliant 1500/1500R/133 Servers, 16MB 189
Proliant 1500/1500R/133 Servers, 32MB 332
Presario Series, Desktops, 8MB 69
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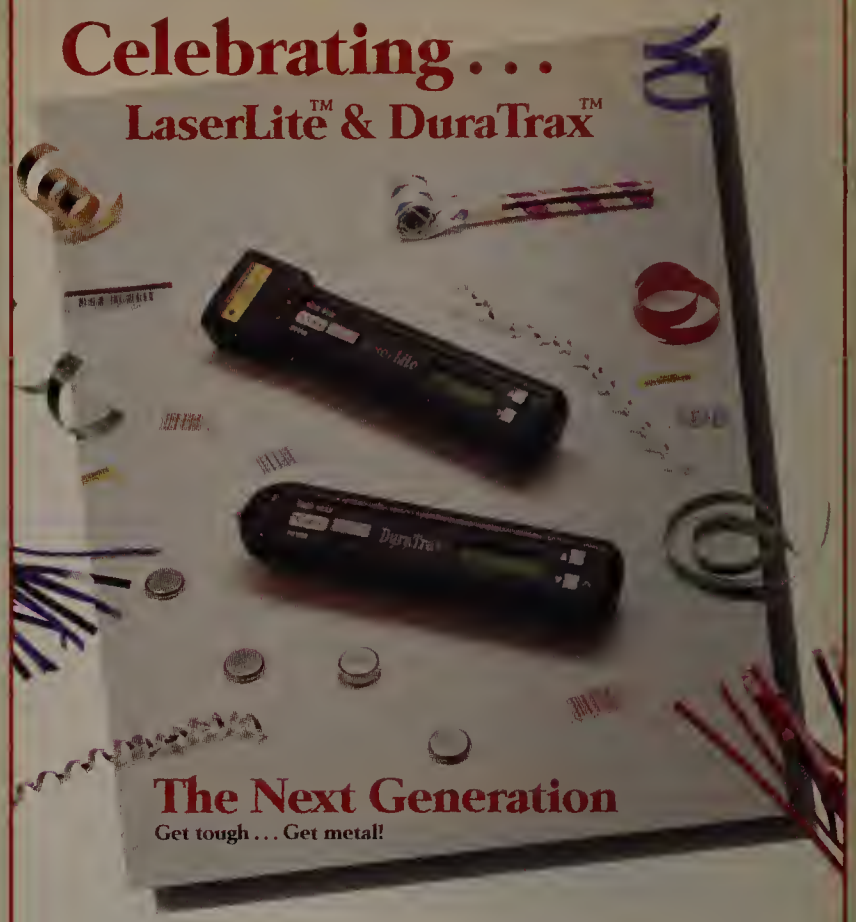

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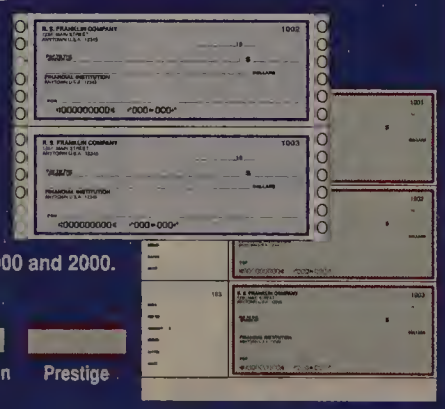

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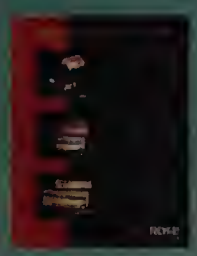

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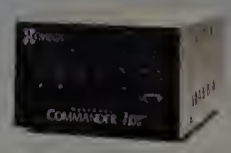

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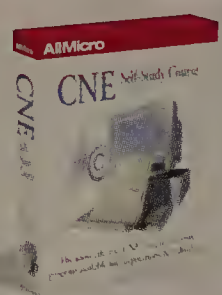

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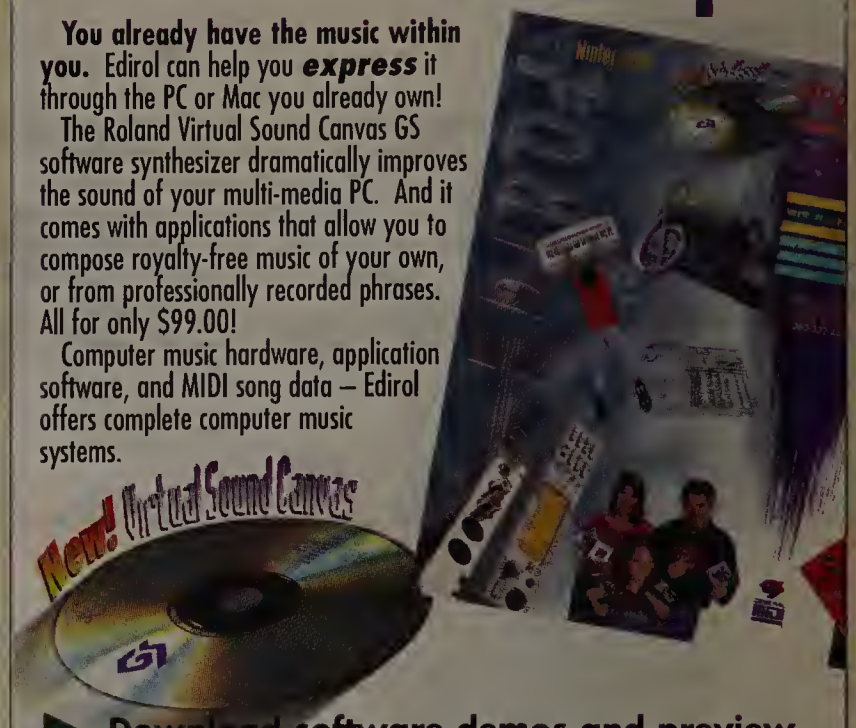

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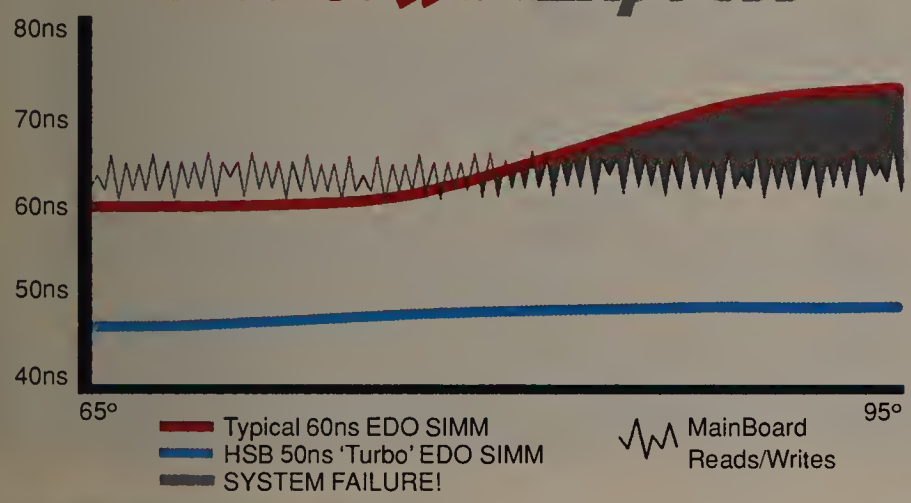

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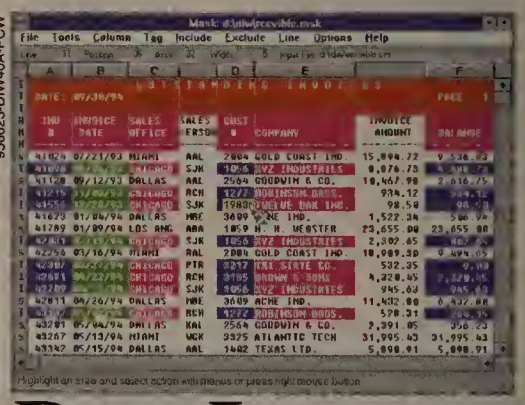

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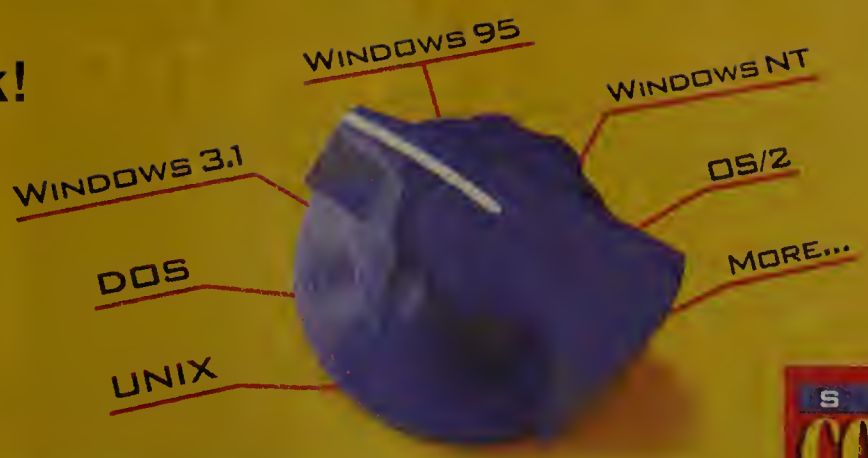

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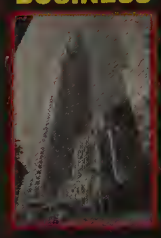

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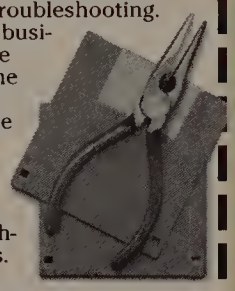

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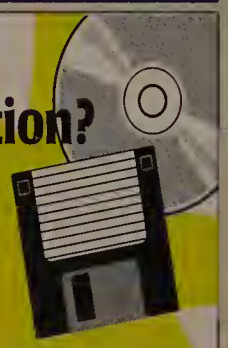

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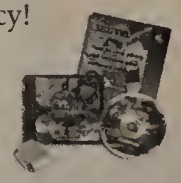

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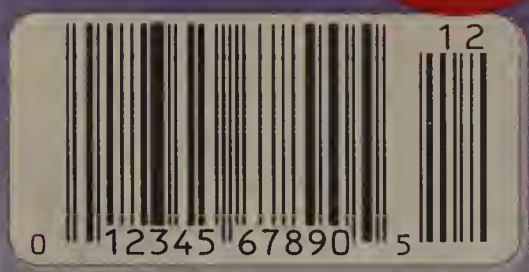

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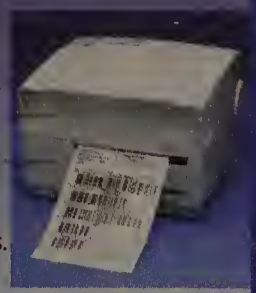

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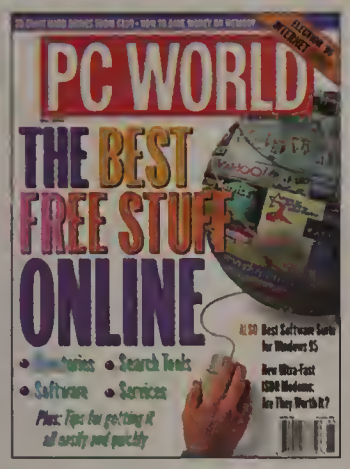

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952 Notebook computers
953 Windows 95 software
954 Monitors and video boards
955 Accounting software
956 Graphics software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
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Larry Bowdish, Publishing Executive, 37; Of Massive Hard Drive Failure

By SIMON BOWDEN

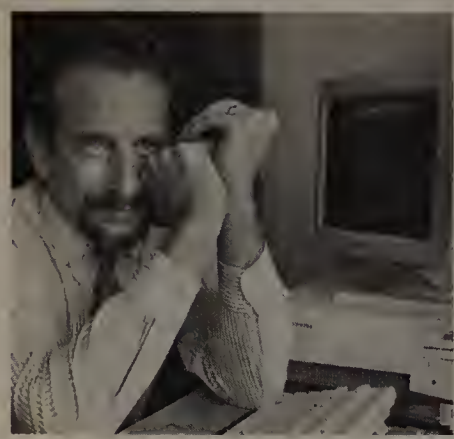
He was the envy of the textbook publishing crowd. The bad boy of the scholastic set. Witty, urbane, and outspoken, Larry Bowdish lit up a sleepy industry with his meteoric rise to the top, but the ride ended suddenly late last night, when he suffered a devastating system collapse during final manuscript edits.

Mr. Bowdish's sudden demise came as a shock to friends, who recalled a man known for his boundless energy and enthusiasm.

"One minute you've got the world by the tail and the next...you've been erased."

"Naturally, we're all a little stunned," said Information Services Director David B. Cohen, "after all, we do encourage employees to save their work every chance they get." Said another colleague, "It's so unfair. I mean, one minute you've got the world by the tail and the next, you've been erased."

Officials have since traced the system collapse, reconstructing Bowdish's last hours and desperate attempts at retrieval. It now appears Mr. Bowdish was downloading from corporate archives onto his workstation, and periodically dumping onto floppy disks. "People can use floppies as backups, but there's an obviously limited capacity. Besides, Bowdish was making changes straight onto the disks without keeping track of his



Larry Bowdish

changes. So, searching for lost data becomes a moot point," explained Cohen.

Mr. Bowdish, who had no known history of hard drive failure, leaves no surviving software. In lieu of flowers, the family kindly requests all leads and reasonable job offers be forwarded to the home address.

Mysterious DOS Virus Claims Famous Accountant

By SIMON BOWDEN

Stephen Cunningham, known affectionately in accounting circles as the Bulldog of Due Diligence, was found not at his desk yesterday morning.

His untimely exit from Simon Co. coincided with the discovery of corrupted files on the largest merger and acquisition project in the history of the firm. It wasn't known whether the data disappearance alone caused Cunningham's sudden departure. However sources revealed that the ex-Senior Vice President's lengthy battle with a mysterious DOS virus was well documented within the firm.

"The Tech Support guys were down here all the time," said long-time assistant Jane Deery. "Steve was always getting these weird system bombs, it was bizarre. But he had an amazing memory and was usually able to re-create whatever was lost."

Stephen Cunningham

Since the information was so important, it's a mystery why the departed didn't back up his hard drive.

Ms. Deery added Mr. Cunningham declined a traditional going away party, wishing instead to "just get on with things."

Nancy Conaty, 34, Accidentally Trashed by Four-year-old Son

By SIMON BOWDEN

Mrs. Nancy Conaty was sole proprietor of an executive search firm run out of the home. The end came in a tragic family accident late Thursday afternoon. Mrs. Conaty had apparently walked into the kitchen to check on a pot roast when son Joey dragged her unsaved document into the trash, then pounded unknown commands on the keyboard.

The computer was rushed to a neighborhood computer store where specialists struggled frantically for several hours to retrieve the lost work. Their attempts were in vain, as the damage was much too widespread. "Had this occurred with a safe backup in place, no big deal," the store manager shrugged. "But there's very little we can do in a case like this."

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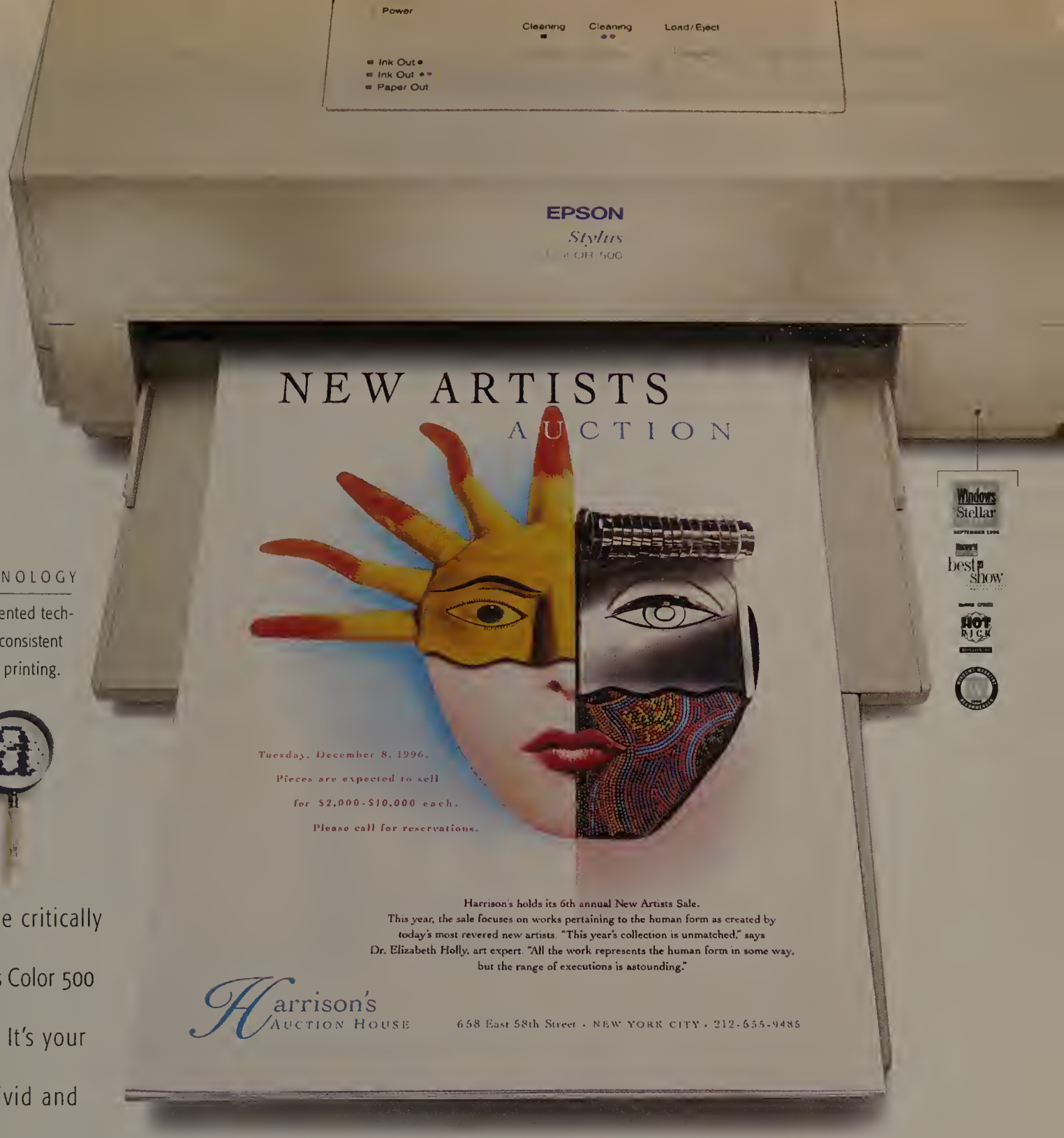

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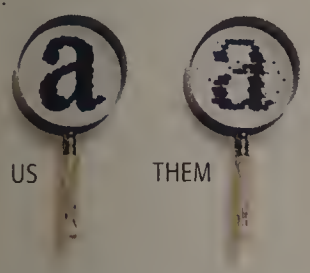

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Let 'em Eat Tech Support!

I'M TICKED. I'm steamed. And in case you haven't noticed, I'm really, really angry. I just wasted 6 hours over the last two days trying to get my Windows 95 machine to do one simple thing it had suddenly stopped doing—play MIDI files. Once again I'm bitterly reminded why all the money we spend on computers never seems to translate into measurable gains in productivity.

Misery loves company. Last week a friend of mine lost a couple of working days trying to get his Windows 95 machine to boot in anything but Safe Mode. His crime? He installed a kids' program that did something awful to his video drivers. He finally decided the easiest solution was to reformat the hard drive and start over.

Installing new hardware and software fouls up Windows systems routinely in ways small, big, and catastrophic. A single device driver in the wrong place, a misguided line in the registry, and your PC, or some aspect of it, is toast.

Many problems are time bombs, lurking silently until the moment when another program calls some obscure function that got obliterated months ago. Even with savvy assistance, the likelihood of figuring out what went wrong can approach the chance of your being hit by a meteor the size of Bill Gates's new house.

One **misplaced** device driver, one misguided line in the **Windows 95** registry, and your system is **toast.**

If anything, Windows 95 has made things worse, not better. Now not only do INI and driver files still cause trouble, but there's a whole dark registry of system settings that almost no one understands. Are you aware that some programs sneakily use the registry to install software that runs when you boot your machine? The only way you're likely to notice is to hit <Ctrl>-<Alt>-<Delete> (once only, please) and observe the strange items at the bottom of the Close Program list.

I found three such programs in my machine, but they weren't the reason my MIDI audio suddenly stopped working. Every time a program tried to call MIDI, a message popped up insisting that some other program was already using the driver.

I don't use MIDI all that often, and I quickly determined that the message simply wasn't true. But just to be safe, I eliminated sound card support, rebooted, reinstalled all the drivers, and rebooted again. It didn't help. Neither did the newer drivers I downloaded from the Web.

The obvious suspects were two multimedia programs I'd recently installed, but their tech wizards insisted the programs couldn't be at fault. Finally a Microsoft guru spent 3 hours on the phone with me, helping me hunt down MIDI references in the INI files and the registry and reinstall every scrap of software that might lead to a solution. No dice. The guru hinted that even reinstalling Windows 95 itself might not do the trick unless I reformatted the drive first.

A minute away from hanging up and throwing the machine out the, uh, window, I attempted one last desperate hunt through the registry. Somehow I stumbled upon the cryptic term 'OldMapper' pointing to 'midimap.drv' and connected with a lousy piece of software I'd installed six months before. Hmmmm. Had that software installed its own MIDI driver and dumped 'midimap.drv', the standard file?

It had indeed. The problem resolved as if by magic as soon as I changed a single file name in a different registry entry—the charmingly named MyComputer\HKEY_LOCAL_MACHINE\System\CurrentControlSet\control\MediaResources\mapper\midimapper. Hey, if the guru and I can do it, you can, too!

We desperately need a system that can protect itself from pillage and plunder. System files should have clearly identifiable version numbers, dates, and descriptions and shouldn't be overwritten by apps except with your permission. When you install updates, the original files should be compressed and retained so you can restore them. Changes to system files and the registry should be logged in detail, with instructions on how to reverse them.

And it'll never happen. Hey, that would just be too complicated for novices. Let 'em view installing a new program with the proper fear and respect! Let 'em think these problems are somehow their fault! Let 'em eat tech support!

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).* ■

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PC World™ (ISSN 0737-8939) is published monthly at $29.90 for one year (12 issues), $59.80 for two years (24 issues), $89.70 for three years (36 issues) by PC World Communications, Inc., 501 Second St. #600, San Francisco, CA 94107. Foreign orders must be prepaid in U.S. funds with additional postage. Add $20 per year for Canada and Mexico; add $46 per year for airmail for all other countries. Canadian GST Registration #R124669680. Periodicals postage paid at San Francisco and additional mailing offices. Canada Post International Publications Mail Product, (Canadian Distribution) Sales Agreement No. 0463566. POSTMASTER: Send address changes to PC World, Subscription Dept., P.O. Box 55029, Boulder, CO 80322-5029. Editorial and business offices: 501 Second St. #600, San Francisco, CA 94107, 415/243-0500. Copyright © 1997, PC World Communications, Inc. All rights reserved. The trademark PC World is owned by International Data Group and used under license by PC World Communications, Inc. PC World Top 20™, Top 20™, PC World Top 10™, Top 10™, PC World Top 100™, Top 100™, and Consumer Watch™ are trademarks of International Data Group, Inc., and used under license by PC World Communications, Inc. Printed in the United States.

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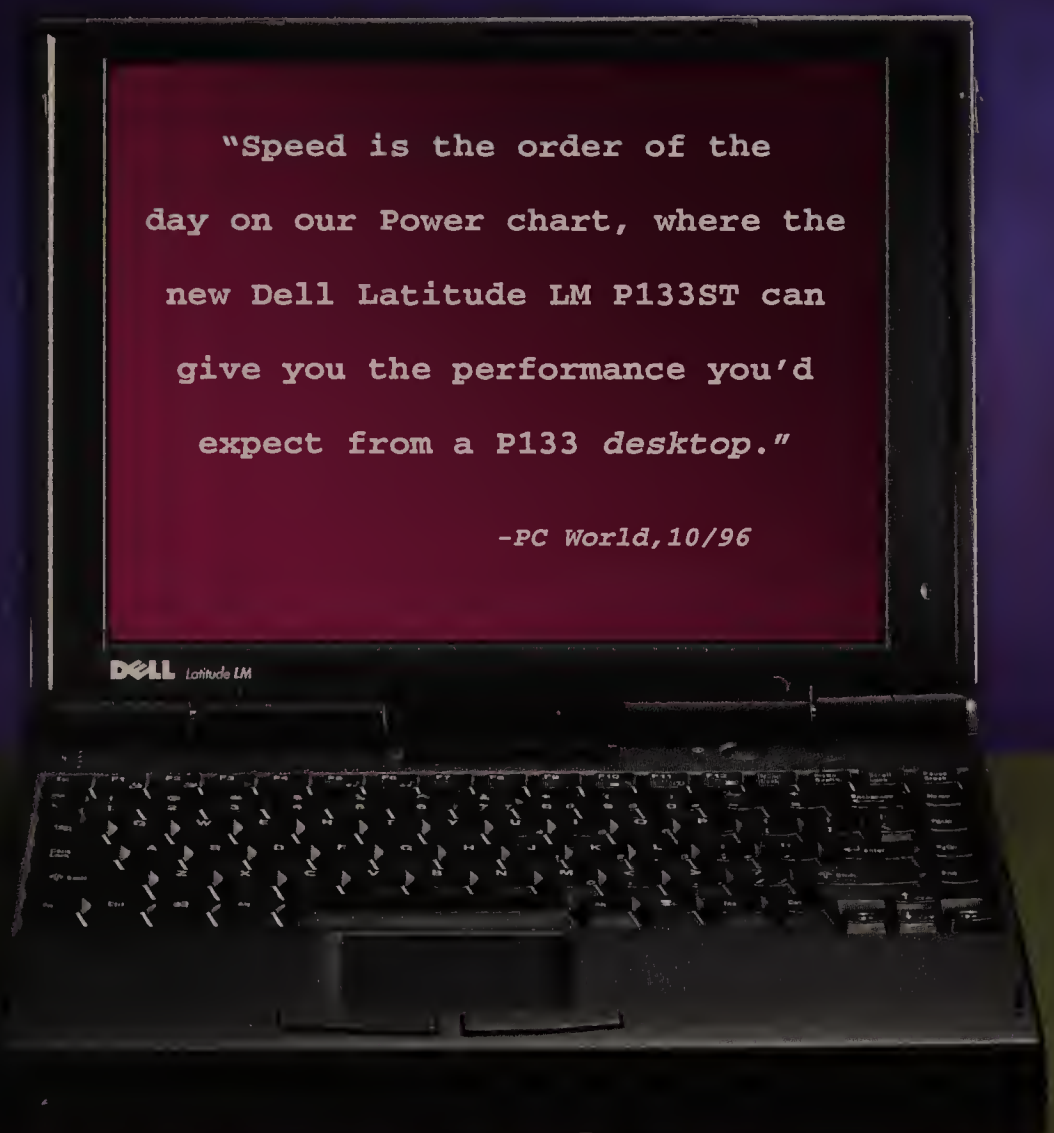

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